DENON

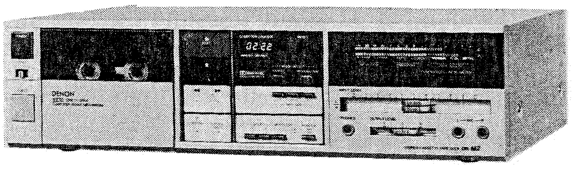
Hi-Fi Component

SERVICE MANUAL

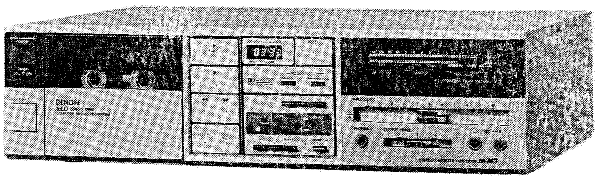
STEREO CASSETTE TAPE DECK

MODEL DR-M2/M3

SMDRM2 Z21
S.MANUAL DRM2/3



DR−M2



DR−M3

NIPPON COLUMBIA CO., LTD.

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MAIN FEATURES

1 Computerized Servo Mechanism

- Direct Drive method, eliminating the rubber belt
- Silent operation with smooth operational feel
- Computer full logic mechanism with high reliability

2 3-head system with newly developed SF combination record/playback head

3 Computer counter

- Remaining tape time
- 4-digit tape counter

4 Automatic tape selector

5 Dolby C noise reduction

- Double Dolby system

6 Wide scale 2-color FL peak meter

- With automatic peak hold provisions (DR-M3)

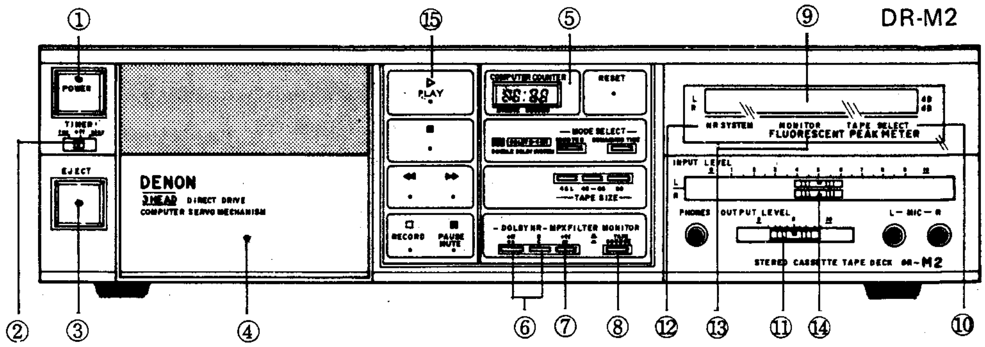
7 Computerized Tuning System (DR-M3)

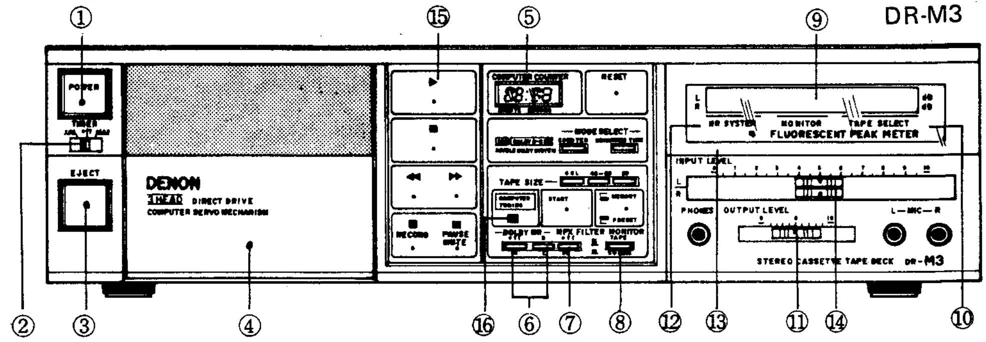
SPECIFICATIONS

Type	Vertical tape loading 4-track 2-channel stereo cassette tape deck
Heads	SF Record/Playback combination head x 1 Double gap ferrite Erase head x 1
Motors	FG servo DD motor (for capstan) x 1 DC motor (for reel winding) x 1
Tape speed	4.8 cm/sec.
Fast forward, rewind time	Approx. 90 sec. with a C-60 cassette tape
Recording Bias	Approx. 105 KHz
Overall S/N ratio (at 3% THD level)	Dolby C ON . . . . . more than 73 dB (CCIR/ARM)
Overall frequency response	25-21,000 Hz ± 3 dB (at –20 dB METAL tape)
Frequency range	20-23,000 Hz (at –20dB METAL tape)
Channel separation	More than 40 dB (at 1KHz)
Crosstalk	More than 65 dB (at 1KHz)
Wow & flutter	Less than 0.027% w rms
Input	
microphone	0.35 mV (–67 dB) with input level control at maximum. Input impedance: 10 Kohm unbalanced.
line	77.5 mV with input level control at maximum. Input impedance: 50 Kohm unbalanced.
Output	
line	775 mV (0 dB) with output level control at maximum. (with 10 Kohm load, recorded level of 200 Pwb/mm)
headphone	1.2 mW with output level control at maximum (optimum load impedance 8 ohm – 2 Kohm).
Accessories	Parallel pin cord x 2, cleaning stick set x 1
Power supply	50 Hz/60 Hz compatible Note: The rated supply voltage is preset to match that used in the country of original shipment.
Power consumption	22 W
Dimensions	434 (W) x 115 (H) x 286 (D) (mm)
Weight	5.7Kg

- Above specifications and design styling are subject to change without notice for improvement.
- "Dolby" and the symbol DD are the registered trademarks of Dolby Laboratories Licensing Corporation. The Dolby Noise reduction system is licensed by Dolby Laboratories Licensing Corporation.

PART NAMES AND FUNCTIONS


DR-M2
①
⑮
⑤
⑨
POWER
TIMER
EJECT
DENON
3HEAD DIRECT DRIVE
COMPUTER SERVO MECHANISM
PLAY
COMPUTER COUNTER
RESET
MODE SELECT
TAPE SIZE
RECORD
PAUSE MUTE
DOLBY NR - MPX FILTER MONITOR
NR SYSTEM
MONITOR
TAPE SELECT
FLUORESCENT PEAK METER
INPUT LEVEL
PHONES
OUTPUT LEVEL
L - MIC - R
STEREO CASSETTE TAPE DECK DR-M2
②
③
④
⑥
⑦
⑧
⑫
⑬
⑪
⑭
⑩


DR-M3
①
⑮
⑤
⑨
POWER
TIMER
EJECT
DENON
3HEAD DIRECT DRIVE
COMPUTER SERVO MECHANISM
COMPUTER COUNTER
RESET
MODE SELECT
TAPE SIZE
START
MEMORY
RECORD
PAUSE MUTE
DOLBY NR - MPX FILTER MONITOR
NR SYSTEM
MONITOR
TAPE SELECT
FLUORESCENT PEAK METER
INPUT LEVEL
PHONES
OUTPUT LEVEL
L - MIC - R
STEREO CASSETTE TAPE DECK DR-M3
②
③
④
⑯
⑥
⑦
⑧
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⑩

1. Power switch (POWER)

The power of the set is turned ON and OFF. The power is turned on when the switch is pressed. It is turned off when pressed again. The set will not be operated for approximately 4 seconds until the set is stabilized after turning on the power supply.

2. Timer switch (TIMER)

This is used when using an audio timer for 'unattended recordings' or 'wake up playback'. Normally, it is kept off.

3. Eject button (EJECT)

This is pressed to open the cassette compartment. When opening the cassette compartment during operations, press the EJECT button after the ■ STOP key is pressed.

4. Cassette compartment

The cassette tape is loaded here. If it is not closed completely, the control buttons do not function.

5. Computer counter (COMPUTER COUNTER)

The tape counter and the remaining tape time is indicated by the 4-digit display.

6. Dolby noise reduction switch (DOLBY NR)

The left switch turns the DOLBY NR SYSTEM on (▬) and off (■). The right switch is used to select either DOLBY-B TYPE (■) or C-TYPE (▬).

7. Multiplex filter switch (MPX FILTER)

This switch is turned on (▬) when making FM recordings using DOLBY to prevent the mis-operation of the DOLBY NR circuit. Turn the switch off (■) when making recordings other than FM recordings using DOLBY.

8. Monitor switch (MONITOR)

Set this switch to SOURCE (▬) when monitoring the sound before it is recorded, such as when setting the recording level; set to TAPE (■) when playing back the tape or monitoring the recorded sound.

9. FL peak meter (FL PEAK METER)

The peak of the recording input level or the playback output level is indicated. An 'automatic peak hold' provision to hold the maximum level for approximately 1.5 seconds above −1dB is built in. (No peak hold provision on the DR-M2)

10. Tape select indicator (TAPE SELECT)

One of the three words 'NORMAL', 'CrO2' or 'METAL' is displayed according to the automatic tape selector, which automatically sets the optimum position when the cassette is loaded into the cassette compartment.

11. Output level knob (OUTPUT)

This adjusts the volume of the headphone as well as the playback/record monitor output.

12. Noise reduction system indicator (NR SYSTEM)

Either 'B-TYPE' or 'C-TYPE' is displayed, according to the DOLBY NR switch.

13. Monitor indicator (MONITOR)

Either 'TAPE' or 'SOURCE' is displayed, according to the MONITOR switch.

14. Record input level knob (INPUT LEVEL)

The record input level is adjusted. The upper knob is for L CH (left channel) and the lower knob is for R CH (right channel).

15. Tape control buttons

PLAY Button

The ▷ PLAY Button is pressed to play back the cassette tape.

STOP Button

The ■ STOP Button is pressed to stop the tape.

REWIND Button

The ◄◄ REW Button is pressed to rewind the tape.

FAST FORWARD Button

The ►► FF Button is pressed to fast forward the tape.

RECORD Button

The ☐ RECORD and PLAY Buttons are pressed together when making recordings. The set will be in the REC PAUSE (record standby) when only the ☐ RECORD Button is pressed.

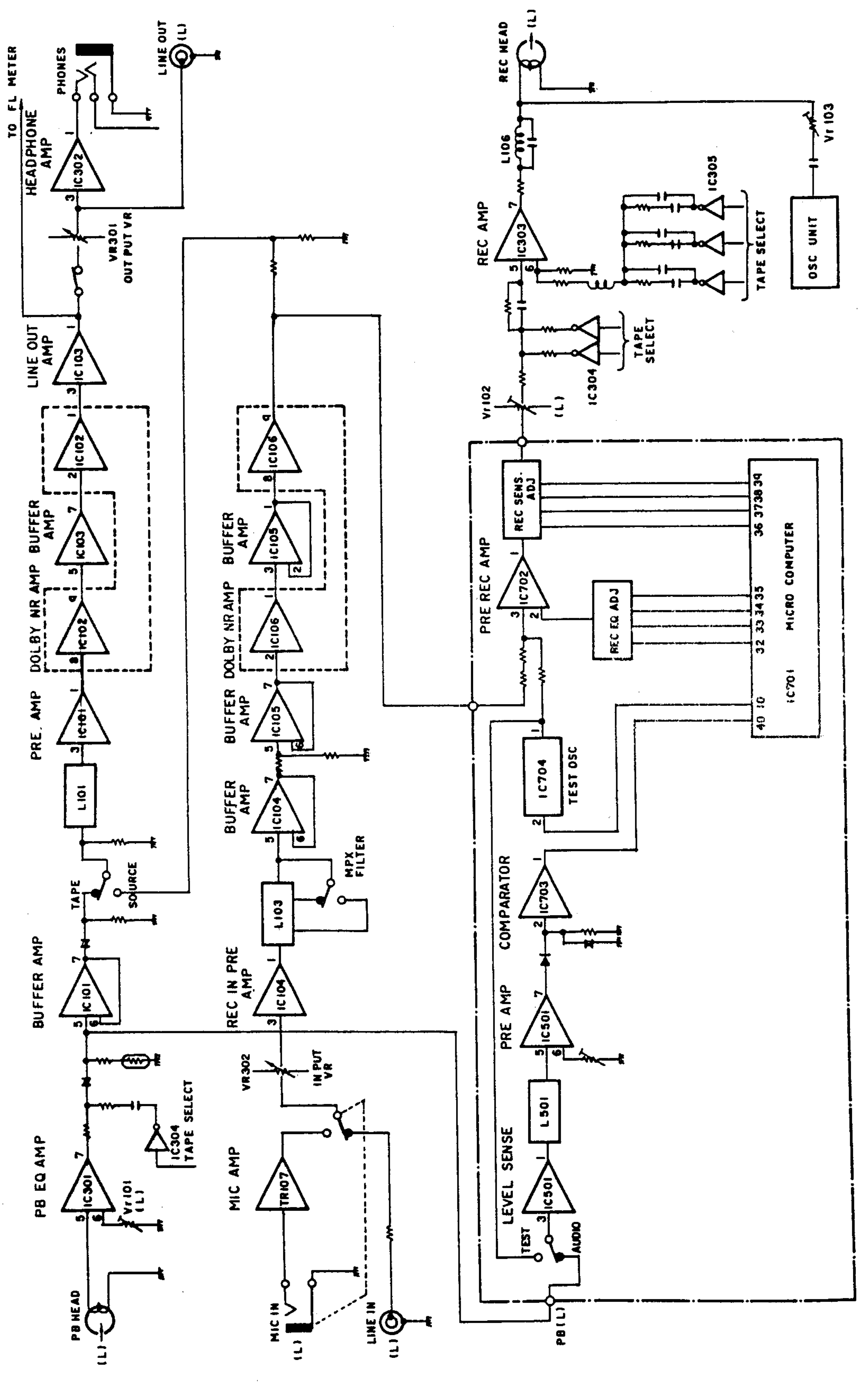
PAUSE/MUTE Button

The PAUSE/MUTE Button is pressed to pause (temporarily stop) the tape during recording or to make a muted (no sound) section.

16. Computerized tuning system (COMPUTER TUNING)

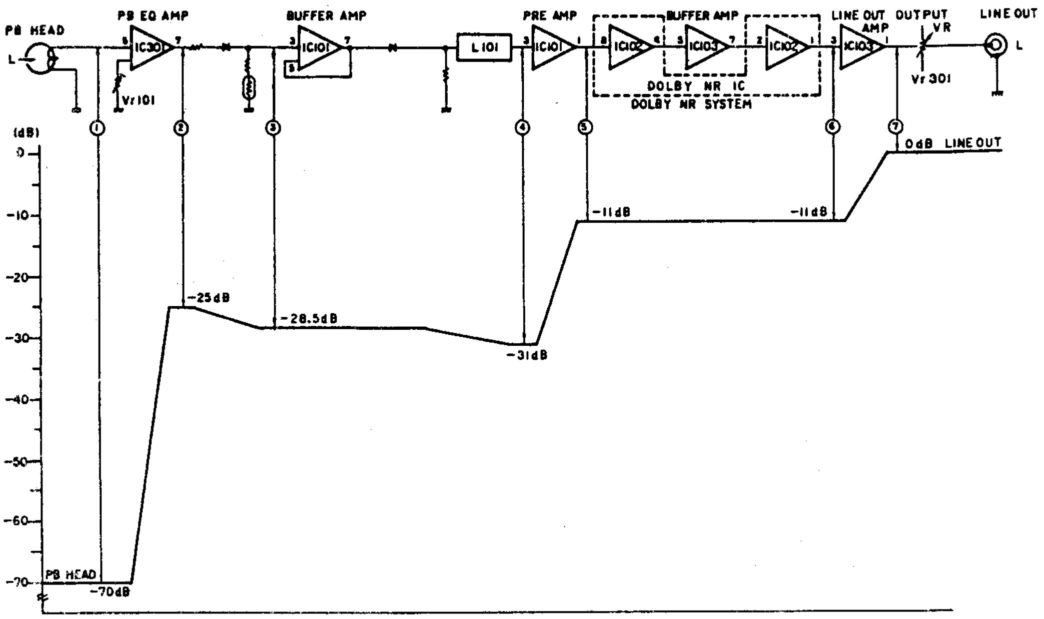
This system automatically adjusts the set to the optimum recording conditions of the tape to be used. (only for DR-M3)

BLOCK DIAGRAM (DR–M3)

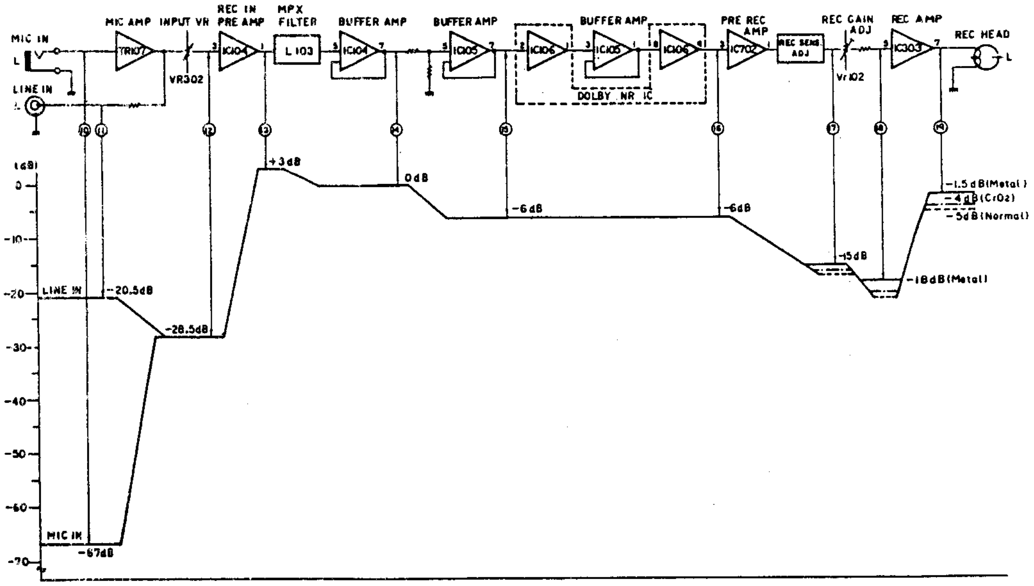

TO FL METER
HEADPHONE AMP
IC302
PHONES
LINE OUT (L)
VR301 OUTPUT VR
LINE OUT AMP
IC103
BUFFER AMP
IC103
DOLBY NR AMP
IC102
IC102
PRE. AMP
IC101
L101
TAPE
SOURCE
BUFFER AMP
IC101
PB EQ AMP
IC301
Vr101 (L)
IC304 TAPE SELECT
PB HEAD (L)
BUFFER AMP
IC105
IC106
DOLBY NR AMP
IC106
BUFFER AMP
IC105
BUFFER AMP
IC104
MPX FILTER
L103
REC IN PRE AMP
IC104
VR302 INPUT VR
MIC AMP
TR107
MIC IN (L)
LINE IN (L)
REC HEAD (L)
L106
Vr103
REC AMP
IC303
IC305
TAPE SELECT
OSC UNIT
TAPE SELECT
IC304
Vr102 (L)
PRE REC AMP
IC702
REC SENS. ADJ
REC EQ ADJ
36 37 38 39
32 33 34 35
40 10
MICRO COMPUTER
IC701
IC704
TEST OSC
COMPARATOR
IC703
PRE AMP
IC501
L501
LEVEL SENSE
IC501
TEST
AUDIO
PB (L)

LEVEL DIAGRAM

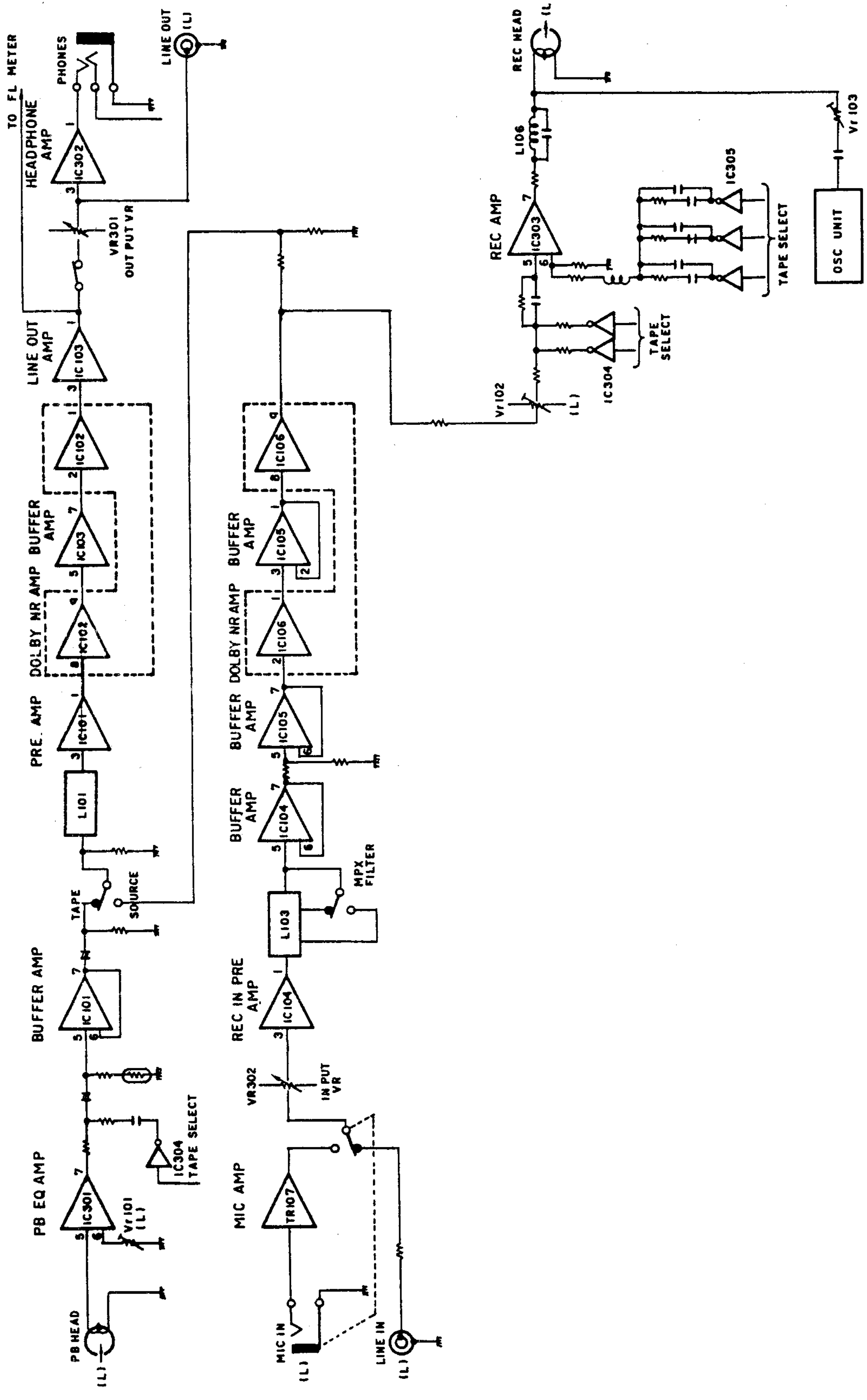
PLAYBACK SYSTEM


PB HEAD
L
PB EQ AMP
IC301
Vr101
BUFFER AMP
IC101
L101
PRE AMP
IC101
BUFFER AMP
IC102
IC103
IC102
DOLBY NR IC
DOLBY NR SYSTEM
LINE OUT AMP
IC103
OUTPUT VR
Vr301
LINE OUT
L
①
②
③
④
⑤
⑥
⑦
(dB)
0
-10
-20
-30
-40
-50
-60
-70
PB HEAD
-70dB
-25dB
-28.5dB
-31dB
-11dB
-11dB
0dB LINE OUT

RECORDING SYSTEM


MIC IN
L
LINE IN
L
MIC AMP
TR107
INPUT VR
VR302
REC IN PRE AMP
IC104
MPX FILTER
L103
BUFFER AMP
IC104
BUFFER AMP
IC105
BUFFER AMP
IC106
IC105
IC106
DOLBY NR IC
PRE REC AMP
IC702
REC SENS. ADJ
REC GAIN ADJ
Vr102
REC AMP
IC303
REC HEAD
L
⑩
⑪
⑫
⑬
⑭
⑮
⑯
⑰
⑱
⑲
(dB)
0
-10
-20
-30
-40
-50
-60
-70
LINE IN
-20.5dB
-28.5dB
+3dB
0dB
-6dB
-6dB
-15dB
-18dB(Metal)
-1.5dB(Metal)
-4dB(CrO2)
-5dB(Normal)
MIC IN
-67dB

BLOCK DIAGRAM (DR–M2)


TO FL METER
HEADPHONE AMP
IC302
PHONES
LINE OUT (L)
VR301 OUTPUT VR
LINE OUT AMP
IC103
DOLBY NR AMP
IC102
BUFFER AMP
IC103
PRE. AMP
IC101
L101
TAPE
SOURCE
BUFFER AMP
IC101
PB EQ AMP
IC301
Vr101 (L)
IC304 TAPE SELECT
PB HEAD (L)
MIC AMP
TR107
MIC IN (L)
LINE IN (L)
VR302 INPUT VR
REC IN PRE AMP
IC104
L103
MPX FILTER
BUFFER AMP
IC104
BUFFER AMP
IC105
DOLBY NR AMP
IC106
BUFFER AMP
IC105
IC106
Vr102 (L)
IC304
TAPE SELECT
REC AMP
IC303
L106
IC305
TAPE SELECT
REC HEAD (L)
Vr103
OSC UNIT

• Outline of the Mechanism Control Microcomputer

The function of the microcomputer, which is applied to the uni-directional transport cam drive control cassette deck mechanism, will receive an outside signal from the operation switch (operations such as PLAY, REC, STOP, FF) during the recognition of the current condition or from the surrounding circuits of the microcomputer (automatic tuning, linear counter, cam encoder, reel pulse, etc.) and sends the appropriate control signal.

To the mechanism: rotational direction of the reel motor, speed, stop, rotational direction of the cam motor, stop.

To the linear counter: makes an output of the mechanism run mode command (REW, FF, PAUSE, PLAY).

To the automatic tuning: REC, P/B, LINE mute signal commands. Makes an output of the BIAS ON/OFF command (CUE command).

To the display: REC, PAUSE (REC MUTE during flash).

In addition, the following points are taken into consideration.

(1) Stable and accurate cam rotation position control is required since a cam drive method is employed to make the mechanism silent. Accurate rotation position control is performed by using a cam drive with a rotary encoder detected digital feedback servo.

(2) Since the leading time of the cam drive is slower when compared to that of the plunger method, problems will arise when attempting record/playback or stop at the designated tape position from FF or REW, since tape overrun occurs. This is especially important when controlling the recording from the position where the automatic tuning was completed.

(Erasing the previous music when making recordings after the automatic tuning is completed must be prevented.)

For this, the tape cuing is corrected after the automatic tuning is completed to control the tape position accurately.

(3) Power outage measures

When the power supply is cut off, the cam of the mechanism shifts to STOP.

(4) Overload measures of the cam

If the cam stops due to an overload for any reason and cannot shift to the target position within 4 seconds, it is immediately shifted to STOP. If this cannot be shifted within 4 seconds, the microcomputer will stop all controls and stop the motor to prevent a breakdown.

• Computer Counter

This counter employs the computer to automatically calculate and display the remaining tape time using the optical detection method. The remaining tape time is displayed in minute/seconds. Up to 6 minutes remaining, the time is displayed in minute units; after 5 minutes 59 seconds, it automatically shifts the display to minutes/seconds.

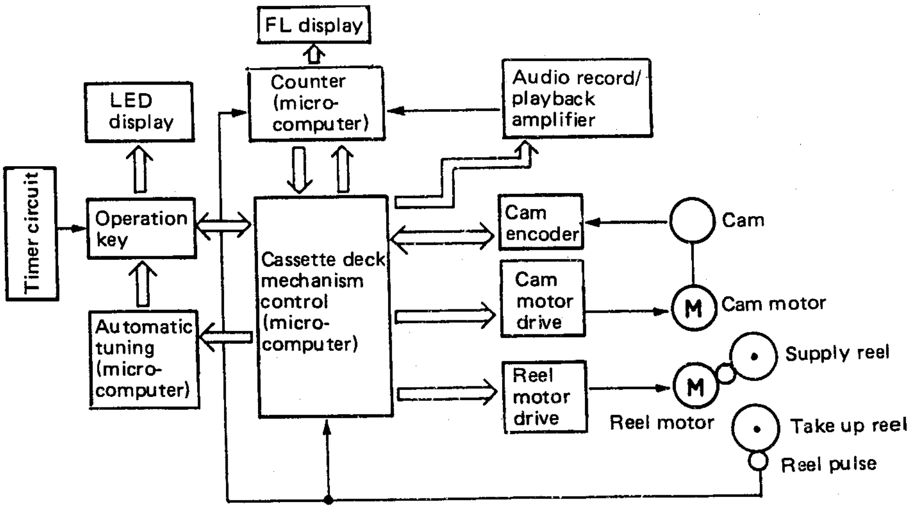
The method used for detecting the remaining time is the optical detection method, which uses LEDs and infra-red sensors. This system detects the pulse of the hub rotation speed, which varies according to the remaining amount of tape, using the reel mount and the synchronized shutter. The information is sent to a microcomputer which constantly calculates and displays the remaining time. In addition, to keep the remaining time variations caused by differing cassette half hub sizes and tape thicknesses to a minimum, selector switches for (1) C-46 (2) C-46 – C-60 (including C-50) and (3) C-90 are provided.

Since this deck is equipped with an automatic tape selector mechanism, it automatically responds to metal tapes, whose tape thickness is different from other tapes. This counter, aside from the remaining tape display, also functions as a bright, easy to see normal electronic counter, using the selector.

• Computer Tuning (CTS)

This tuning system automatically sets the equalizer and recording sensitivity, both of which are important to maximizing the performance of various tapes and to make high quality recordings. The tuning time is only 5 seconds; recording chances are not missed. When the cassette is loaded, the auto tape selector sets the deck to the standard optimum condition. Strictly speaking, however, the recording sensitivity and frequency characteristics of the tapes vary, depending on its type.

The computer tuning system allows the maximum performance of the tape to be heard and at the same time ideally corrects the frequency characteristics to a flat and wide range characteristic.



DISASSEMBLY INSTRUCTIONS

1. How to Remove the Front Panel

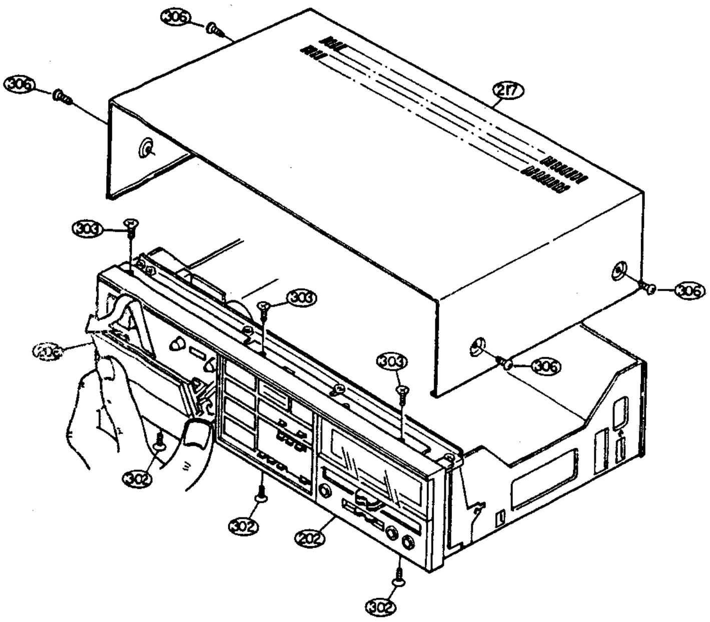
(1) Unscrew the 4 screws (4x8 CTTS P tight) 306 from both sides of the top cover 217 and take off the top cover by pulling it up.

(2) Press the eject knob 204, open the cassette window 206 and take off the mechanism, as shown in the diagram.

Note: Be careful when handling the cassette window, as it is easily scratched.)

(3) Remove the connector (5P) with lead wires, which runs from the timer switch 243 to the rear of the logic circuit board 241, from the logic circuit board.

(4) The front panel can be removed by unscrewing the 3 upper screws (3x8 CFTS S tight) 303 from the front panel 202 and the 3 lower screws (3x8 CFTS P tight) 302.



2. How to Remove the Mechanisms

(1) Remove the top cover 217 and the front panel 202. (Refer to section 1)

(2) Unscrew the 2 mechanism holding screws (3x6 CBTS S tight 301 from the bottom surface of the chassis 218.

(3) Unscrew the 2 screws (3x6 CBTS S tight) 301 holding the angle 233 and the mechanism 201 and the 3 meter frame 223 and chassis holding screws (3x8 CBTS P tight) 304 and remove the angle.

(4) Remove the connectors with lead wires, which runs from the mechanism section, from the circuit board.

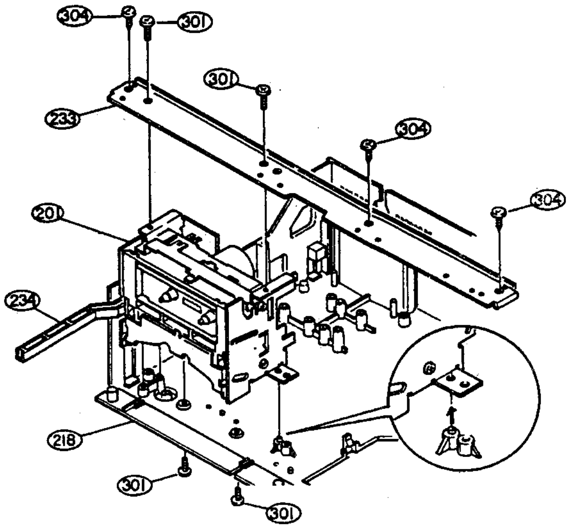
Audio circuit board side	2P connector CN101 CN201
	3P connector CN302
	4P connector CN301 CN303
Logic circuit board side	2P connector CN12 CN13
	4P connector CN6 CN9
	5P connector CN10
	6P connector CN11

Note: When assembling, check to make sure the connectors are inserted correctly.

(5) Pull out the power switch lever 234 from the power switch 245.

(6) The mechanism can be removed by holding the mechanism and pulling up.

Note: When assembling, do so after checking to make sure the 2 stay holes on the lower side of the mechanism unit are matched with the chassis protrusions.



3. How to Remove the Control Circuit Board

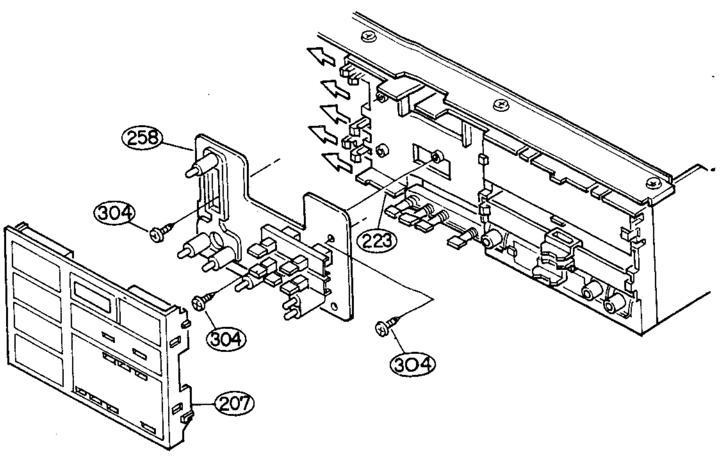
(1) Remove the top cover 217 and the front panel 202. (Refer to section 1)

(2) Using a small minus screwdriver, loosen the 2 hooks on one side of the meter frame 223 which holds the control cover 207 and remove the control cover.

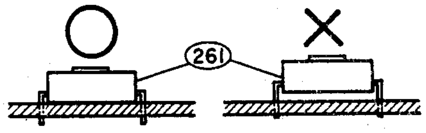
(3) Remove the connectors with lead wires which run from the control circuit board 258.

FL counter circuit board side	6P connector CN403
Logic circuit board side	8P connector CN1
	4P connector CN2
CTS circuit board side	8P connector CN701 (only for DR-M3)

(4) By unscrewing 3 screw (3x8 CBTS P tight) 304 holding the control circuit board and loosening the 3 hooks on the left side of the meter frame, the control circuit board 258 can be removed.



Note: When replacing the tight switch 261, always check to make sure that it is not floating above the circuit board. If it is floating, the switch will be in the on condition when the set is assembled.



4. How to Remove the FL Meter

(1) Remove the top cover 217 and the front panel 202. (Refer to section 1)

(2) Remove the 12P and 4P connectors on the FL meter circuit board 256.

(3) By loosening the left/right hooks on the meter frame 223, which holds the FL meter, the color filter 225 and the FL meter can be removed together with the circuit board.

Note: The FL tubes are glass, be careful when handling.

5. How to Remove the FL Counter

(1) Remove the top cover 217 and the front panel 202. (Refer to section 1)

(2) Remove the 2P, 6P and 9P connectors from the FL counter circuit board 257.

(3) By unscrewing the 2 screws (3x6 CBS) 308 on the upper section of the FL counter, the FL counter can be taken out towards the back, together with the circuit board.

Note: The FL tubes are glass, be careful when handling.

6. How to Remove the CTS Circuit Board (only for DR-M3)

(1) Remove the top cover 217. (Refer to section 1)

(2) The CTS circuit board 255 can be removed upwards by pulling it upwards and loosening the 2 hooks on the chassis 218.

7. How to Remove the Audio Circuit Board

(1) Remove the top cover 217 and the front panel 202. (Refer to section 1)

(2) Unscrew the lower screw 301 holding the mechanism and the chassis. (Refer to section 2)

(3) Remove the angle 233. (Refer to section 2)

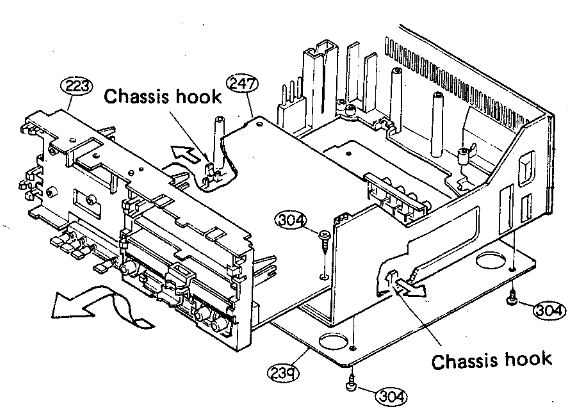
(4) Remove the control circuit board 258, FL meter 256 and the FL counter 257. (Refer to sections 3, 4, 5)

(5) Remove the connectors from the audio circuit board 247.

(6) Remove the CTS circuit board 255. (Refer to section 6)

(7) Unscrew the 2 bottom cover holding screws (3x8 CBTS P tight) 304 on the back side of the chassis and remove the bottom cover 239.

(8) By lifting the meter frame 223 and loosening the 2 hooks on the chassis holding the audio circuit board 247, the audio circuit board can be removed.



When Separating the Audio Circuit Board by Itself

(9) Remove the mask sheet 226 from the meter frame.

(10) Loosen the hook on the left side of the meter frame holding the longer rail 213 and remove the guide rail together with the knob 215.

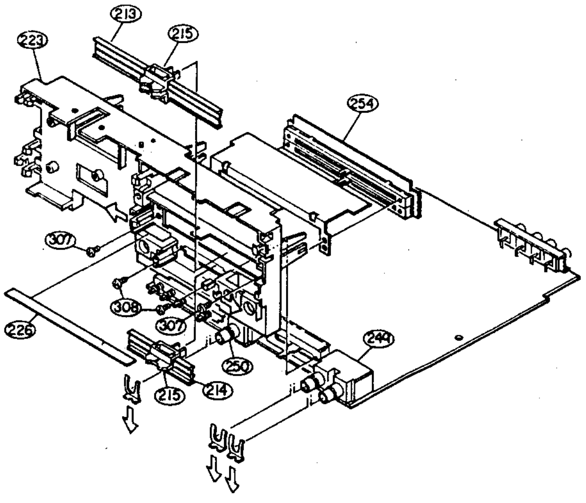
(11) Unscrew the 2 screws (2.6x5 CBS) 307 holding the input volume 254 and loosen the 2 rear hooks and remove the input volume toward the rear.

(12) Loosen the hook on the right side of the meter frame holding the shorter guide rail 214 and remove the guide rail together with the knob 215.

(13) Unscrew the 2 screws (3x6 CBS) 308 holding the output volume 248.

(14) Pull down the steel mounts holding the microphone jack 249 and the headphone jack 250.

(15) By removing the meter frame 223, the audio circuit board can be removed by itself.



Note: Most repairs to the audio circuit board can be performed by removing the bottom cover on the chassis. Refer to the above procedure only when necessary.

When reassembling, follow the procedures in reverse order; however, if each of the various parts are not assembled properly in their respective positions, the set cannot be assembled. When assembling, check the work of each step carefully.

8. How to Remove the Logic Circuit Board

(1) Remove the top cover 217. (Refer to section 1)

(2) Remove the CTS circuit board 255. (Refer to section 6) (only for DR-M3)

(3) Remove the various connectors from the logic circuit board 241.

(4) Unscrew the 4 screws (3x8 CBTS P tight) 304 holding the logic circuit board.

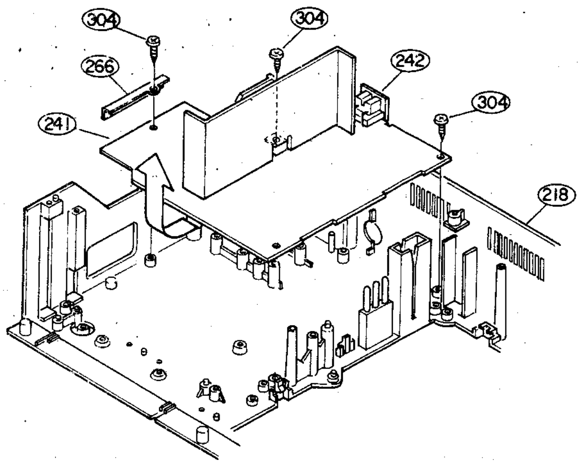
(5) Pull the logic circuit board 241 forward until the remote jack 242 is disconnected from the rear of the chassis 218; it can then be removed.

9. How to Remove the Power Supply Circuit Board

(1) Remove the top cover 217. (Refer to section 1)

(2) Unscrew the 1 screw (3x8 CBTS P tight) 304 holding the bracket 221 of the power supply circuit board 244.

(3) By pulling the power switch lever 234 out of the power supply switch, the power supply circuit board can be removed upwards.



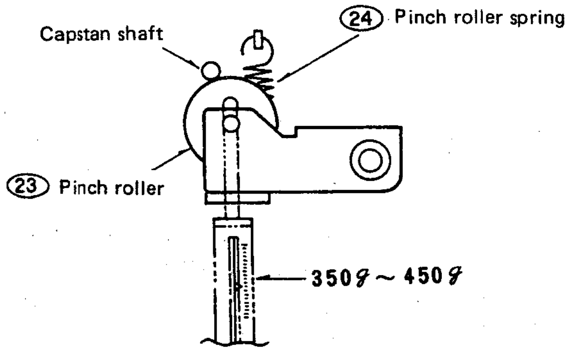
ADJUSTING AND CHECKING THE MECHANISM SECTION

1. Replacing the Pinch Roller 23

Before replacing the pinch roller, clean the tape contact surface of the pinch roller and the capstan shaft.
Most causes of poor tape transport can be traced to dirty pinch rollers and capstan shafts.
The pinch roller 23 can be removed by removing the spring 24 and the slit washer 317.
After replacing, run a padless C-90 tape to check for tape curls at the tape guide section of the head.

2. Checking the Pressure Force of the Pinch Roller

In the playback mode, hook a spring weight onto the bracket at the center of the pinch roller. After separating the pinch roller from the capstan shaft, allow the pinch roller to contact the capstan shaft again. Check to make sure the spring weight reads between 350–450g when the pinch roller starts to rotate. If it is not within the normal range, replace the pinch roller spring 24.



3. Replacing the Record/Playback Head

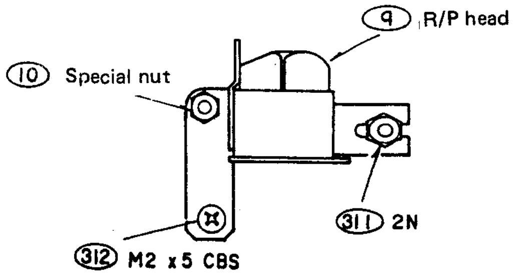
* Before replacing, remove the front panel 202.

(1) How to remove the R/P HEAD.

1) Unscrew the recording head holding screw 312.

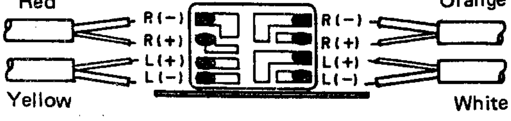
2) Next, take out the azimuth adjustment NUT 311 and the height adjustment ORDER SCREW 10 loosening them alternately.
If they are not loosened alternately, the R/P HEAD base may become warped.

3) By unsoldering the HEAD WIRES on the circuit board section of the R/P HEAD, the entire R/P HEAD can be taken off the mechanism unit.



(2) How to assemble the R/P HEAD.
Reverse the above (1) procedures for removing the R/P HEAD.

* Solder the HEAD WIRES according to the diagram above.

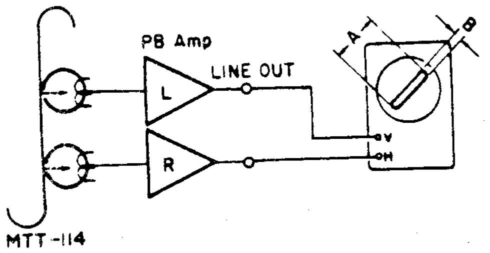


4. Adjusting the R/P HEAD

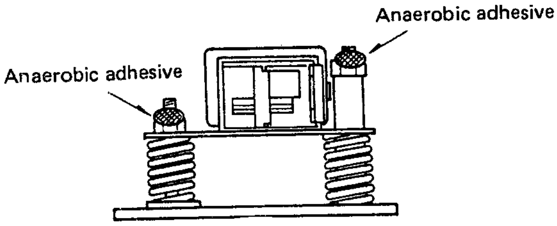
(1) Height adjustments (Use the head adjusting jig M-300)
Set the M-300 tool plate on the mechanism unit; turn the height adjustment ORDER SCREW 10 and adjust so that the 3.8 mm measure section of the M-300 (tool grip) can pass without contacting the tape guide of the R/P HEAD 9..

* Only the height adjustment is necessary; no tilt ajustments are required.
* When adjusting the height, make sure the R/P HEAD is not tilted by turning the azimuth adjustment nut, and checking with your eyes.
* Never allow the M-300 (tool grip) to hit the tape contact surface of the R/P HEAD strongly. It may scratch the surface.

(2) Azimuth adjustments
Play back the TEAC MTT-114 test tape. Turn the azimuth adjustment nut and adjust so that A of the resurge wave form is maximum and B is minimum. After the azimuth adjustments, re-check the head height with the M-300 to make sure the height has not deviated.



* After the adjustments, apply anaerobic adhesive on the positions indicated in the diagram.

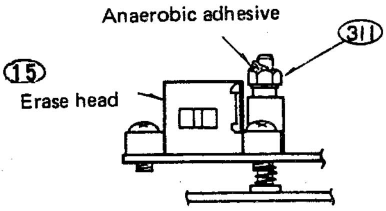


5 . Replacing the ERASE HEAD 15

Remove the slit washer 315 holding the tension arm ass'y 17; after removing the tension arm ass'y, unscrew the 2 ERASE HEAD holding screws 31 and replace the ERASE HEAD. When attaching the ERASE HEAD, position it to the lower side.

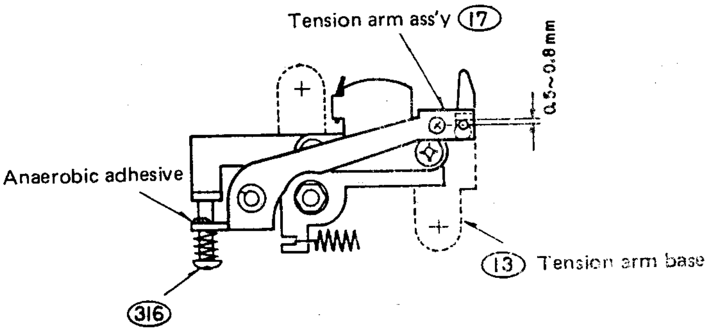
6. Adjusting the ERASE HEAD Height

Using the head adjusting jig (M-300), turn the height adjustment nut 311 and adjust the height in the same manner as adjusting the R/P HEAD. After the adjustments, apply anaerobic achesive on the position indicated in the diagram.



7. Adjusting the Gap Between the Tension Arm Ass'y 17 and Arm Base

Load a cassette tape and place the set in the playback mode. Adjust the adjustment screw 316 so that the gap between the tension arm ass'y and the tension arm base is 0.5 – 0.8 mm. After the adjustments, apply anaerobic adhesive on the position indicated in the diagram.



8. Checking for Axis Direction Movements of the Capstan Shaft

Hold the capstan shaft from the front of the mechanism and move it in the axis direction; check to make sure some movement exists.

9. Checking the Take-up Torque

Load the cassette type torque meter. Check to make sure that the torque meter average reading is within 35~65 g-cm during playback. If it is not within this range, check the voltage (5.1 – 5.3V) of the reel motor. If the voltage is low, the torque will be weak; if it is high, the torque will be strong. In addition, check for reel thrust movement in section 10.

10. Adjusting the Reel Thrust Movement

Check to make sure that the reel thrust movement is within 0.2–0.4 mm.

11. Checking the FF and REW Torques

- * When using the cassette type torque meter.
  Check to make sure the torque meter indicates more than 70 g-cm at the end of FF and REW.
- * When using a modified cassette half.
  Load the modified cassette half; hook the end of the dial tension meter (full scale 100–300 g) onto the triangle section. In the FF (REW) mode, feed the tape in at a rate somewhat slower than the take up speed. Check to make sure the dial tension meter reads more than 60 g-cm.

12. Checking the Back Tension Torque During Record/Playback

Load the cassette type torque meter; check to make sure the torque meter reads between 2–5 g-cm during playback and that there is no unevenness.

If it is not within this range, check the section on adjusting the reel trust movement; or else replace the spring 26.

13. Checking the FF and REW Times

Load a C-60 cassette tape; check to make sure the tape is fast forwarded or rewound within 70–110 seconds. If it is not within this range, check sections 10 and 12.

14. Checking the Operation of the Erase Prevention, Metal and Chrome Switch Operation Arms

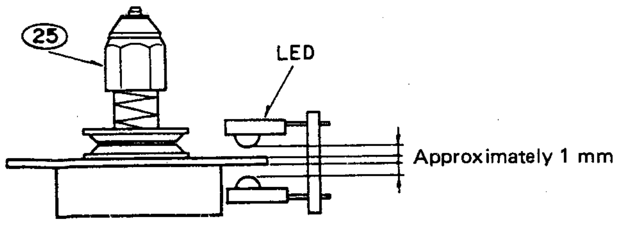
Check to make sure the operation arms 58, 59 operate the switches positively, depending on whether or not there are holes.

15. Checking the EJECT Switch 75

To check the operation of the EJECT SW with only the mechanism unit, make sure the hook lever A operates the switch positively when the EJECT lever 64 is operated.

16. Checking the Gap Between the Pulse Detection LED and the Reel Ass'y

Check to make sure the gap between the surface of the shutter section of the reel ass'y and the LEDs is approximately 1 mm.



ADJUSTING THE ELECTRICAL SECTIONS

- **Measuring instruments necessary for adjustments**

(1) Audio signal generator
(2) Variable resistance attenuator
(3) Vacuum tube voltmeter
(4) Oscelloscope
(5) Frequency counter
(6) Adjustment screwdriver
(7) Trap coil adjustment square stick
(8) Test tapes (TEAC MTT-111, MTT-114, MTT-150,
(A-BEX TCC-262)
(DENON DX 3, DXM, DX7/50N, LX)
(9) Transport Check cassette tape
(COLUMBIA C-120, modified)

- **Cautions on adjusting**

(1) Before adjusting, clean the head surface, capstan and the pinch roller with a gauze or a cotton swab moistened with alcohol.
(2) Demagnetize the R/P HEAD and the E. HEAD with a head eraser.
(3) Completely demagnetize the adjustment screwdriver.
(4) Unless instructed otherwise, set the various controls as follows:
   - INPUT volume . . . . maximum
   - OUTPUT LEVEL volume . . . . maximum
   - DOLBY NR switch . . . . OFF
   - MONITOR switch . . . . TAPE

1. Tape Transport Check

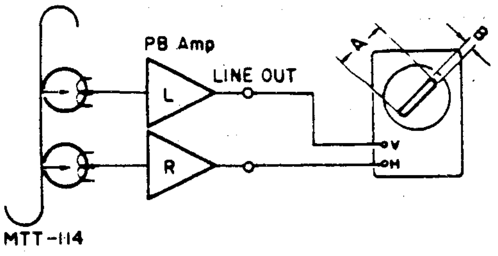
Load the transport check cassette. In the operational mode, illuminate the fixing guides of the R/P HEAD with a lamp and check to make sure the tape edge does not come in contact with the tape guide section.

The tape transport is the most important element in determing the performance of a cassette deck.

Avoid moving the various adjustment screws, nuts, etc., as much as possible. Refer to the pages on "Adjusting and Checking the Mechanism Section" when replacing or adjusting the R/P HEAD.

2. Adjusting the Azimuth

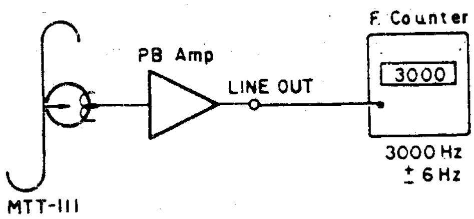
(1) After completing the tape transport check, load the test tape (TEAC MTT-114).
(2) Play back the test tape; adjust the azimuth screw so that section A of the resurge wave form is maximum and section B is minimum.



3. Checking and Adjusting the Tape Speed

1) Connect the frequency counter to the LINE OUT terminal and load the test tape (TEAC MTT-111).

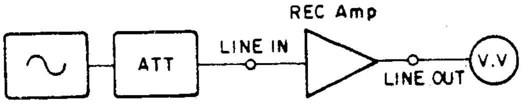
2) Play back the test tape; at the midpoint of the tape, where the transport is stable, adjust VR 901 so that the frequency counter reading is in the range of 3,000 Hz ± 6Hz.



4. Adjusting the Input Sensitivity

(1) Set the MONITOR switch to SOURCE position, the operational mode at STOP. Supply a 400 Hz signal to the LINE IN terminal and set the input signal level (approx. –20 dB) so that the output level at the LINE OUT TERMINAL (L ch) becomes 0dB.

(2) At the same time, check to make sure the R ch output level is also 0dB.

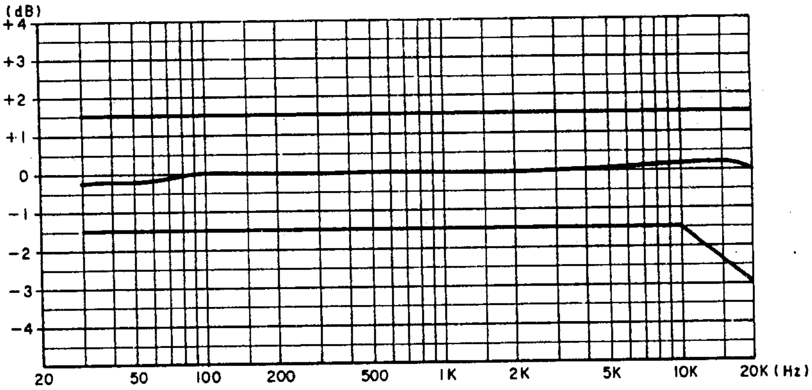


5. Checking the Operation of the DOLBY

Set the MONITOR switch to SOURCE. When a –41dB signal input is made to the LINE IN terminal, check to make sure the output frequency response from the LINE OUT terminal meets the specification in the diagram below.

Dolby C Back to Back Frequency Response

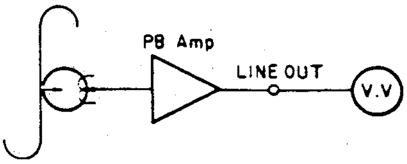
Level : –20dB from Dolby
Monitor : SOURCE
Dolby NR : on, C



6. Adjusting the Playback Section

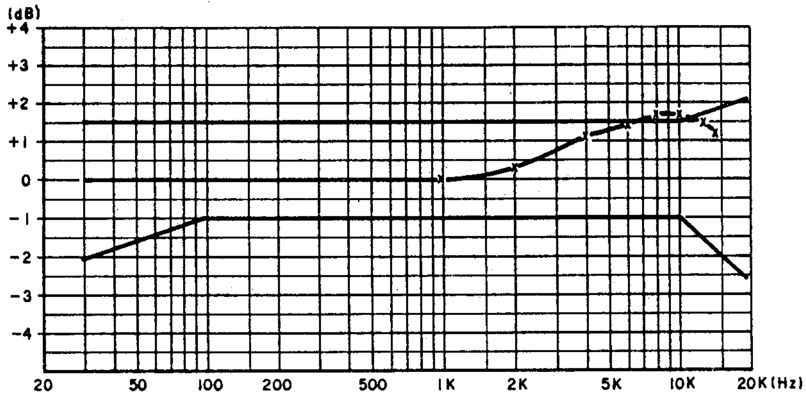
(1) Adjusting the playback level
Play back the Dolby standard level test tape (TEAC MTT-150) and adjust Vr 101 (L ch), Vr 201 (R ch) so that the LINE OUT voltage becomes 0 dB (0.775 V).

(2) Adjusting the playback frequency response
Play back the test tape (A.BEX TCC-262) and (check to make sure that the frequency response meets the specifications in the diagram.



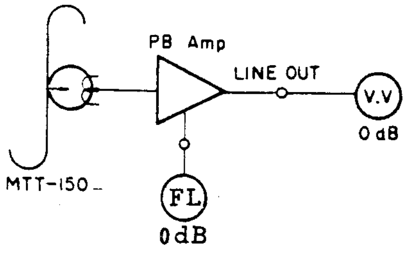
Playback Frequency Response

Tape : A.BEX Tcc-262
When using MTT-316 make corrections along.



7. Adjusting the FL Meter

After adjusting the playback level, play back the test tape (TEAC MTT-150) and adjust VR 801 (L ch), VR 802 (R ch) so that the FL meter indicates 0dB when the LINE OUT terminal level is 0dB (0.775V).

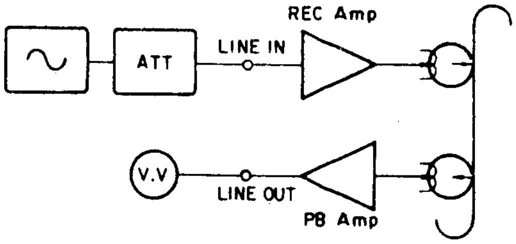


8. Adjusting the Recording Section

(1) Adjusting the record/playback overall frequency response.

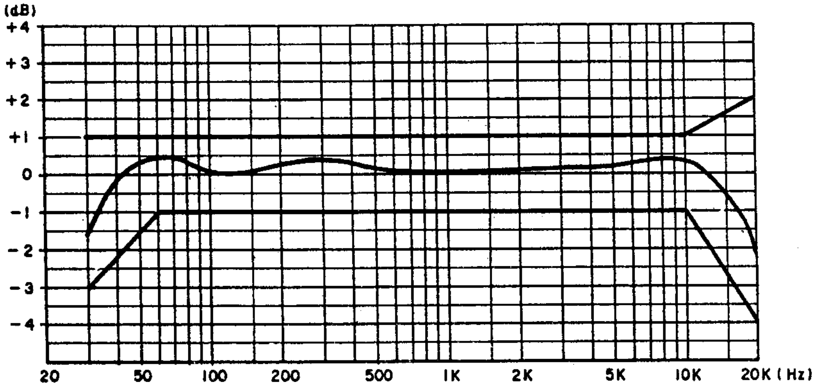
1) Load the test tape DX7/50N; record a signal with an input level of –41 dB, 1 KHz at the LINE IN terminal; play back this recording.

2) Change the frequency of the input signal to 12kHz, record and playback; adjust VR 103 (L ch), VR 302 (R ch) so that the characteristic standards meet the following diagram when compared to the 1kHz signal output level.



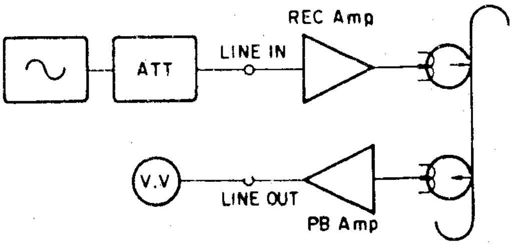
Record/Playback Overall Frequency Response

Tape : DX7N
Dolby : off
Level : –20dB from Dolby



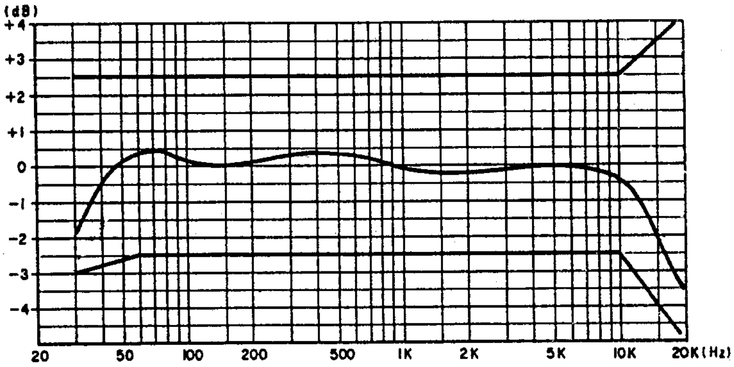
(2) Adjusting the record/playback levels
  1) Load the test tape DX7/50N and record a signal of 1 KHz (−41 dB).
  2) Adjust Vr 102 (L ch), Vr 202 (R ch) so that the output level is the same when the MONITOR switch is switched from SOURCE to tape position.

(3) Checking the Dolby C record/playback overall frequency response
  1) Set the DOLBY NR switch to the "C" position.
  2) Using the test tapes DXM, DX7/50N, DX-3, perform record/playback in the same manner as 8-(1).
  3) Check to make sure that the record/playback overall frequency response meets the specifications in the diagram.



Dolby C Record/Playback Overall Frequency Response.

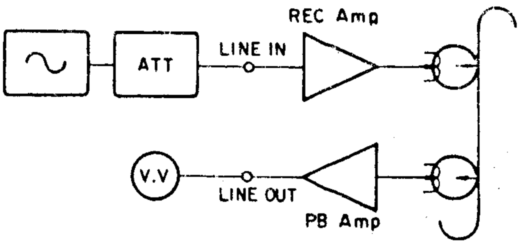
Tape : DX7N
Dolby : on, C
Level : −20dB from Dolby



9. Adjusting the CTS

(1) Adjusting the CTS Amplifier Gain
Set the switch S701 of the CTS circuit board to the TEST side and press the CTS START button. During its operation, adjust VR 501 (L ch), VR 601 (R ch) so that the levels at TP(L), TP(R) alternates frequently between H → L or L → H.

(2) Checking the CTS Operation
  1) Load the LX-C60 cassette tape. Light the preset lamp and set to the preset mode. Record/playback 1kHz and 12kHz signals and note the frequency response.
  2) Press the CTS START button. After it is completed, (CTS lamp lit), record/playback the 1kHz signals and check to make sure the frequency response is improved over those recorded in section (1).



- **Beat Interference**

Beat interference may result if the unit is used close to an AM tuner. In this case separate the distance between the tuner and the cassette deck.

PARTS LIST OF MECHANISM UNIT

Ref. No.	Part No.	Part Name	Remarks
1	4118350402	MECHA BASE ASS'Y	
2	4438636107	C-GUIDE POST	
3	4318076201	HEAD SLIDER ASS'Y	
4	4318083304	HEAD PLATE ASS'Y	
5	4258011009	φ3 STEEL BALL	
6	4318080200	BALL GUIDE PLATE	
7	4638230002	SPRING	
8	4638819009	SPRING	
9	3918076000	R/P HEAD	
10	4438671104	SPECIAL NUT	
11	4418994005	CORD HOLDER	
13	4418967304	T-ARM BASE ASS'Y	
14	4338210102	E-HEAD BASE ASS'Y	
15	3918031003	E-HEAD	
16	4638626108	SPRING	
17	4338212304	TENSION ARM ASS'Y	
18	4638235201	SPRING	
19	4638630000	SPRING	
20	4338224208	STOPPER	
21	4438674305	TENSION POST	
22	4618125108	FRICTION FELT	
23	4338194105	P-ROLLER ARM ASS'Y	
24	4638231108	SPRING	
25	4218320109	REEL ASS'Y	
26	4638624100	SPRING	
27	4338199003	FRICTION PLATE	
28	4418961300	LAMP HOLDER	
29	4338238100	I. ARM (B) G ASS'Y	
30	4338239109	IDLER ARM (B) ASS'Y	
31	4218324202	IDLER ASS'Y	
32	4618126107	FRICTION FELT	
33	4638625109	SPRING	
34	4428029102	THRUST WASHER	
35	4338236102	IDLER ARM (A) ASS'Y	
36	4638244001	SPRING	
37	2178079000	DC MOTOR ASS'Y	
39	4418962105	DC MOTOR FIX PLATE	
40	4318081209	BRAKE	
41	4618127106	BRAKE SHOE	
42	4638234105	SPRING	
43	4338232106	BRAKE ARM ASS'Y	
44	4438648205	METAL HOUSING ASS'Y	
45	4218355006	CAPSTAN WHEEL SUB ASS'Y	
46	2228530004	FG PATTERN P.W.B	
47	4418964103	BACK PLATE	
48	4438650206	CAPSTAN STOPPER	
49	3468148200	STATOR COIL	
50	4770090074	WASHER	
51	2760303016	HL-300C	
52	4418966208	CAM MOTOR HOLDER	
54	2178080109	CAM MOTOR ASS'Y	
55	4248027304	CAM	
57	4428018104	ENCORDER BRACKET	

Ref. No.	Part No.	Part Name	Remarks
58	4338225304	HOLD SENSOR (1)	
59	4338226400	HOLD SENSOR (2)	
60	4338227302	LEVER	
61	4638240005	SPRING	
62	4418969302	RIGHT STAY ASS'Y	
63	4418971206	LEFT STAY ASS'Y	
64	4338216203	EJECT LEVER	
65	4338218201	HOOK LEVER (A)	
66	4338219006	HOOK LEVER (B) ASS'Y	
67	4638238004	SPRING	
68	1038212306	CASSETTE BOX (A)	
69	4338215301	CASSETTE BOX (B)	
70	1038213004	CASSETTE SUPPORT (L)	
71	1038219105	CASSETTE SUPPORT (R)	
72	4438654202	COLLAR	
73	4638236103	BOX SPRING	
74	4698013104	AIR DUMPPER	
75	2129200006	SLIDE SWITCH	
76	1448508105	ESC PLATE	
77	3939179009	LED	
78	4458028009	CORD HOLDER	
79	KU-0455	CAP SERVO UNIT	
80	2123331201	ROTARY ENCORDER	
81	3939178000	LN25RCP	
82	3939026000	PN150	
83	2129201005	SLIDE SWITCH	
301	4737002005	3x6 CBTS (S)	
302	4737500028	3x8 CFTS (P)	
307	4713202010	2.6x5 CBS	
310	4713206016	2.6x12 CBS	
311	4756020000	2N	
312	4713102013	2x5 CBS	
313	4713201011	2.6x4 CBS	
314	4770090003	WASHER	
315	4751119107	SLIT WASHER	
316	4713104011	2x8 CBS	
317	4751121108	SLIT WASHER	
318	4737500002	3x6 CBTS (P)	
319	4761000002	1.5E-RING	
320	4713802012	2.6x3 CBS	
321	4751120109	SLIT WASHER	
322	4713801039	2x3 CBS	
323	4761003009	3E-RING	
324	4761002000	2.5E-RING	
325	4713801026	2x14 CBS	
326	4713204018	2.6x8 CBS	
327	4730154028	2x8 CRTS	
328	4751003006	3W	

PARTS LIST OF EXPLODED VIEW

Ref. No.	Part No.	Part Name	Remarks
201	3388013004	V. MECHA. [61] UNIT	
202	1038214537	FRONT PANEL ASS'Y	DR-M2, EU, EC
	1038214511	FRONT PANEL ASS'Y	DR-M2, E2, E1 EA, EF, EG, EK
	1038214524	FRONT PANEL ASS'Y	DR-M3, EU, EC
	1038214508	FRONT PANEL ASS'Y	DR-M3, E2, E1 EA, EF, EG, EK
203	1138156304	PUSH KNOB (A)	
204	1138157400	PUSH KNOB (B)	
205	4638627000	SPRING	
206	1038217314	CASSETTE WINDOW	EU, EC
	1038217301	CASSETTE WINDOW	E2, E1, EA, EF, EG, EK
207	1038224200	CONTROL COVER ASS'Y	
209	1168004235	CONTROL SHEET	DR-M2, EU, EC
	1168004219	CONTROL SHEET	DR-M2, E2, E1, EA, EF, EG, EK
	1168004222	CONTROL SHEET	DR-M3, EU, EC
	1168004206	CONTROL SHEET	DR-M3, E2, E1, EA, EF, EG, EK
210	1138158205	PUSH KNOB (C)	
211	1138159327	PUSH KNOB (D)	EU, EC
	1138159301	PUSH KNOB (D)	E2, E1, EA, EF, EG, EK
212	1138159330	PUSH KNOB (D)	EU, EC
	1138159314	PUSH KNOB (D)	E2, E1, EA, EF, EG, EK
213	1198009404	GUIDE RAIL	
214	1198009417	GUIDE RAIL	
215	1138160219	SLIDE KNOB (A)	
216	1138155101	SLIDE KNOB (B)	DR-M3
	1138155101	SLIDE KNOB (B)	DR-M2, EU, EC
	1138155114	SLIDE KNOB (B)	DR-M2, E2, E1, EA, EF, EG, EK
217	1028319206	TOP COVER	
218	4118341505	CHASSIS	EU, EC, E2
	4118341518	CHASSIS	E1
	4118341505	CHASSIS	EA, EF, EG, EK
219	4610162004	FELT PAD	
220	4118342300	TRANS BRACKET	EU, EC, E1
	4118342313	TRANS BRACKET	E2, EA, EF, EG, EK
221	4118343202	POWER SW BRACKET	
222	1038226102	P.S. LEVER GUIDE	
223	4118344308	CONT. & METER FRAME	
224	4118345307	SHIELD PLATE	
225	1298019307	COLOR FILTER	
226	1298022006	MASK SHEET	
227	1198010202	DUMMY BLOCK (A)	PLAY, STOP
228	1198011308	DUMMY BLOCK (B)	REC. PAUSE FF. REW
229	1198012200	DUMMY BLOCK (C)	RESET

Ref. No.	Part No.	Part Name	Remarks
230	1198013209	DUMMY BLOCK (D)	DR-M3 FTS START
231	1198014208	DUMMY BLOCK (E)	DR-M3 MEMORY/PRESET
232	4128747005	SHIELD BRACKET	
233	4118346102	ANGLE	
234	4318082402	POWER SW LEVER	
235	4118347101	EARTH PLATE (A)	
⚠ 236	2339064003	POWER TRANS	EU, EC
	2339068009	POWER TRANS	E2, EF, EG
	2339071009	POWER TRANS	E1
	2339072008	POWER TRANS	EA, EK
⚠ 237	2062019008	AC CORD WITH PLUG	EU, EC
	2062002031	AC CORD WITH PLUG	E2, EF, EG
	2006031026	AC CORD WITH PLUG	E1
	2006019310	AS 3P AC CORD	EA
	2062024006	AC CORD WITH LABEL	EK
⚠ 238	MD-3802	BUSHING	EU, EC, E1
	4450018004	BUSHING	E2, EF, EG, EK
	MD-2982	CORD BUSH	EA
239	1058089108	BOTTOM COVER	
240	KU-0449	PWR & LOGIC UNIT	DR-M3
	KU-0449-1	PWR & LOGIC UNIT	DR-M2
241	KU-0449 A	PWR & LOGIC ASS'Y	DR-M3
	KU-0449A1	PWR & LOGIC ASS'Y	DR-M2
242	2048110002	8P DIN JACK	
243	KU-0449 B	TIMER SWITCH ASS'Y	
⚠ 244	KU-0449 C	POWER SUPPLY ASS'Y	
⚠ 245	2129136028	POWER SWITCH	EU, EC
	2129136015	POWER SWITCH	E2, E1, EA, EF, EG, EK
246	KU-0450	AUDIO UNIT	DR-M3
	KU-0450-1	AUDIO UNIT	DR-M2
247	KU-0450A	AUDIO ASS'Y	DR-M3
	KU-0450A1	AUDIO ASS'Y	DR-M2
248	2118071107	J3020V20DA103	
249	2048108001	MIC-JACK	
250	2048109000	HEADPHONE JACK	
251	2048114008	4P PIN JACK	
252	2129189004	PUSH SWITCH	
253	KU-0450B	INPUT VR ASS'Y	
254	2118072106	J10002H10CA503	INPUT VR
255	KU-0451	FTS UNIT	DR-M3 only
256	KU-0452	FL METER UNIT	DR-M3
	KU-0452-1	FL METER UNIT	DR-M2
257	KU-0453	FL COUNTER UNIT	
258	KU-0454	CONTROL UNIT	DR-M3
	KU-0454-1	CONTROL UNIT	DR-M2
259	2129213103	PUSH SWITCH	
260	2129214102	PUSH SWITCH	
261	2124388004	TACT SWITCH	
262	3939180001	LED (RED)	
263	3939181000	LED (AMBER)	
264	3939182009	LED (GREEN)	
265	4428017008	COVER PLATE	DR-M2 only
266	4428055002	P.W.B SUPPORT	

Ref. No.	Part No.	Part Name	Remarks
267	1298022019	MASK SHEET	
268	2123315023	VOLTAGE SELECTOR	E1 only
301	4737002005	3x6 CBTS (S)	
302	4737500028	3x8 CFTS (P)	
303	4737003004	3x8 CFTS (S)	
304	4737500015	3x8 CBTS (P)	
306	4737503009	4x8 CTTS (P)	
307	4713203019	2.6x5 CBS	
308	4713303016	3x6 CBS	
309	4730359014	3x16 CRTS	
310	4737002018	3x8 CBTS (S)	

ACCESSORIES GROUP

Ref. No.	Part No.	Part Name	Remarks
	2032101001	2P CONNECTOR CORD	
	5118233007	INS. MANUAL	EU, EC
	5118241002	INS. MANUAL	E2, E1, EA, EF, EG, EK
	5118153006	SAFETY INSTRUCTION	
	5158053001	WARRANTY IN ENVELOPE	

CARTON CASE GROUP

Ref. No.	Part No.	Part Name	Remarks
	5018891000	CARTON CASE	DR-M3
	5018291013	CARTON CASE	DR-M2
	5038042006	PACKING	
	5058092007	RAMINATE COVER	

KU-0455A CAPSTAN SERVO UNIT

Ref. No.	Part No.	Part Name	Remarks
IC901	2630224005	μPC1043C	
IC902	2630189001	M5218L	
TR904,906	2720055029	2SB772Q/P	
TR901,902	2730204035	2SC2320E/F	
TR903,905	2740078031	2SD882Q/P	
HE901,902	2760303016	HL-300C	
			Metal film
R908	2452231001	RN14K2E104G	100KΩ
VR901	2116020011	K08Q06MB503	50KΩB
			Variable resistor
C906	2533643000	CC45SL1H471J	470PF 50V
C910	2539013003	CK45=1E473M	0.047μF 25V
C901,902	2539014002	CK45=1E683M	0.068μF 25V
C912	2531055056	CK45B1H221K	220PF 50V
			Electrolitic
C905	2544129005	CE04W1A470=	47μF 10V
C903,913	2544132005	CE04W1C100=	10μF 16V
C904	2544140000	CE04W1V4R7=	4.7μF 35V
C911	2544146004	CE04W1H010=	1μF 50V
			Film
C907	2551069006	CQ93M1H562K	0.0056μF 50V
C914,915	2551076002	CQ93M1H223K	0.022μF 50V
C908	2554194046	CQ93P1H223J	0.022μF 50V
CN901	2032075001	2P CONNECTOR BASE	
CN902	2031639008	4P EI CON WITH WIRE	
CN904	2041630000	5P EI CON WITH WIRE	KU-0455B
CN905	2041632008	6P MINI CONNE CORD	KU-0455C
LE4,6	3939178000	LN25RCP	〃
PTR1,2	3939026000	PN150	〃
CN906	2031638038	2P EI CON WITH WIRE	KU-0455D
CN907	2031639024	4P EI CON WITH WIRE	〃

- The carbon resistors rated at ¼W are not listed herein.

Remarks symbols in the parts list refer to the following countries and areas.

EA: Australia
EK: United Kingdom
EU: U.S.A.
E1 : Multiple voltage model
E2 : European continent
EF : French
EG: German
EC: Canada

WARNING:
Parts marked with ⚠ and/or shading have special characteristics important to safety. Be sure to use the specified parts for replacement.

KU-0449A POWER AND LOGIC UNIT

Ref. No.	Part No.	Part Name	Remarks
IC1	2620408006	UPC 1511C	
IC2	2620229007	M74LS138P	
IC3, 4	2620197003	M74LS32P	
IC5, 6	2620326007	BA6109	
IC7	2630225004	NJM78M09A	
TR1~3 21, 22	2710102034	2SA1015Y/GR	
TR19	2710105002	2SA966Y	
TR23	2720055029	2SB772Q/P	
TR4~8, 10 14~16 24~27	2730245023	2SC2603E/F	
TR17,18,20	2740078031	2SD882Q/P	
DB1, 2	2760246005	RB152	
D18~21 24~28	2760237001	RV06	
ZD1, 9	2760185027	HZ4B2	
ZD3	2760236057	HZ5C3	
ZD7	2760173042	HZ6B1	
ZD6, 4	2760173071	HZ6C3	
ZD5	2760218046	HZ9B1	
ZD8	2760052079	HZ11B2	
ZD10	2760299052	HZ3B3	
D1~12 24~17 22, 23	2760049008	IS2076	
			Carbon film
R42	2442028017	RS14B2E330JFRF	33Ω ¼W
R30	2440029021	RS14B3A101JNBF	100Ω 1W
R29	2440079026	RS14B3D270JNBF	27Ω 2W
			resistor Block
RB-1	2462011046	RK99=2B472MP3	3.7KΩ ¼Wx3
RB-4	2462011075	RK99=2B103MP3	10KΩ ¼Wx3
RB-6	2462010076	RK99=2B103MP4	10KΩ ¼Wx4
RB-2	2462012003	RK99=2B103MP8	10KΩ ¼Wx8
RB-3	2462011088	RK99=2B153MP3	15KΩ ¼Wx3
RB-5	2462010092	RK99=2B104MP4	100KΩ ¼Wx4
			Ceramic
C9, 11	2539013003	CK45=1E473M	0.047μF 25V
C6	2539014002	CK45=1E683M	0.068μF 25V
C1, 2, 8 10,12,25	2531024003	CK45F1H103Z	0.01μF 50V
C4	2533627000	CC45SL1H101J	100PF 50V
C5	2533635005	CC45SL1H221J	220PF 50V
CB-2	2531153000	CK99B1H102MP4	0.001μF 50V
CB-1	2610036006	CK93F1H03ZF6	0.01μF 50V
			Electrolitic
C13, 16	2544009002	CE04W1A470=	47μF 10V
C15, 24 26,27,31,33		CE04W1A101=	100μF 10V
C7	2544132005	CE04W1C100=	10μF 16V
C28	2544018006	CE04W1C101=	100μF 16V
C20, 21	2544163003	CE04W1C221=	220μF 16V
C23,29,30	2544163032	CE04W1C102=	1000μF 16V
C22	2544088007	CE04W1C222=	2200μF 16V

Ref. No.	Part No.	Part Name	Ramarks
C14	2546071009	CE04W1E103=	10000μF 25V
C3, 24	2544140000	CE04W1V4R7=	4.7μF 35V
C17, 18	2544141009	CE04W1V100=	10μF 35V
C19	2544159004	CE04W1V101=	100μF 35V
CN3, 10	2035622066	5P MINI CONNE PIN	
CN2,6,9	2035622024	4P MINI CONNE PIN	
CN5	2035622095	9P MINI CONNE PIN	
CN1	2035622037	8P MINI CONNE PIN	
CN11	2035622082	6P MINI CONNE PIN	
CN4	2037642015	4P EI CON WITH WIRE	
CN7	2045405008	9P EI CON WITH WIRE	
CN12, 13	2032075001	2P CONNECTOR BASE	
CN8	2050170001	12P BOARD PIN BASE	DR-M3 only
	4178062109	HEAT SINK (L)	TR17
	4178079008	RADIATOR	TR18, 23, IC7
	2048110002	8P DIN JACK	
CRM1	3998031007	CERAMIC RESONATOR	800KHZ

- The carbon resistors rated at ¼W are not listed herein.

KU-0499B TIMER SWITCH UNIT

Ref. No.	Part No.	Part Name	Remarks
	2129188005	SLIDE SWITCH	
CN14	2039632023	5P MINI CONNE CORD	

KU-0449C POWER SUPPLY UNIT

Ref. No.	Part No.	Part Name	Remarks
⚠ SK1	2618006009	SPARK KILLER	EU, EC
⚠	2538010007	CK45=2GAC103P	E2, E1, EA, EA, EG, EK
⚠ LF1	2398019002	LINE FILTER COIL	
⚠	2061031045	FUSE 210mA	E1
⚠	2061031032	FUSE 160mA	E2, EA, EF, EG, EK
	5138254024	FUSE LABEL	E1
	5138254011	FUSE LABEL	E2, EA, EF, EG, EK

KU-0450A AUDIO AMP UNIT

Ref. No.	Part No.	Part Name	Remarks
IC304,305	2620277004	M74LS05P	
IC301	2630226003	M5220L	
IC102,202 106,206	2630222007	NE652	
IC101,201 103,203, 104,204, 105,205, 303	2630229000	LA6458DS	
IC302	2630125007	MPC4557C	
TR303	2710102034	2SA1015Y/GR	
TR101~106 108~113 201~206 208~213 301, 302 305~308	2730245023	2SC2603E/F	
TR107,207	2730198028	2SC1815 (GR)	
TR304	2730195005	2SC2060 (Q)	
TH-101,201	2760118007	D-33A	
ZD301	2760218046	HZ9B1	
	2760049008	1S2076	
			Variable resistor
Vr101,201	2116000031	V08PB102	1KΩB
Vr102,202	2116000044	V08PB503	〃 50KΩB
Vr103,203	2116000086	V08PB204	〃 200KΩB
VR301	2118071107	J3020V20DA103	〃 10KΩA
			Ceramic
C102,202	2533627000	CC45SL1H101J	100PF 50V
C112,212	2533633007	CC45SL1H181J	180PF 50V
C319, 320	2539012004	CK45=1E333M	0.033μF 25V
C115,215 139, 239	2539014002	CK45=1E683M	0.068μF 25V
C322	2531022005	CK45F1H222Z	0.0022μF 50V
C101,201 160,260	2531055056	CK45B1H221K	220PF 50V
C132,232 321	2531004007	CK45B1H102K	0.001μF 50V
C159,259	2531056026	CK45B1H122K	0.0012μF 50V
C155,255	2531005006	CK45B1H152K	0.0015μF 50V
C157,257 150, 250	2531006005	CK45B1H222K	0.0022μF 50V
C156,256	2531061008	CK45B1H272K	0.0027μF 50V
C154,254	2531007004	CK45B1H332K	0.0033μF 50V
C316	2531062007	CK45B1H392K	0.0039μF 50V
			Electrolitic
C311	2544161047	CE04W0J471=	470μF 6.3V
C103,203 301,302 304,310	2544129005	CE04W1A470=	47μF 10V
C307,308	2544131006	CE04W1A221=	220μF 10V

Ref. No.	Part No.	Part Name	Remarks
C105,107 108,111 113,119 125,126 134,137 145,146 151,161 205,207 208,211 213,219 225,226 234,237 245,246 251,261 303,305 306,312	2544132005	CE04W1C100=	10μF 16V
C131,133 231,233 313,314	2544140000	CE04W1V4R7=	4.7μF 35V
C117,124 142,149 217,224 242,249	2549014005	CE04W1HR10=	0.1μF 50V
C118,143 218,243	2549014034	CE04W1HR15=	0.15μF 50V
C309	2544147003	CE04W1H2R2=	2.2μF 50V
			Film
C158,258	2551063002	CQ93M1H182K	0.0018μF 50V
C109,120 135,144 153,209 220,235 244,253	2551120084	CQ93M1H472J	0.0047μF 50V
C104,204	2551120097	CQ93M1H562J	0.0056μF 50V
C106,121 138,206 221,238	2551121025	CQ93M1H103J	0.01μF 50V
C315	2551074004	CQ93M1H153K	0.015μF 50V
C110,136 210,236	2551121083	CQ93M1H333J	0.033μF 50V
C116,123 141,148 216,223 241,248 318	2551078000	CQ93M1H333K	0.033μF 50V
C114,140 214,240	2551122008	CQ93M1H473J	0.047μF 50V
C152,252	2551080001	CQ93M1H473K	0.047μF 50V
C317	2554118909	CQ93P2A562J	0.056μF 100V
C122,147 222,247	2561030025	CF93B2A224J	0.22μF 100V
S301	2129189004	PUSH SWITCH	
RL301	2140020003	REED RELAY	
L102,104 202,204	2358011008	INDUCTOR	
L105,205	2358005001	INDUCTOR	
L301	2358005014	INDUCTOR	

Ref. No.	Part No.	Part Name	Remarks
L101,201	2310825008	BIAS FILTER	
L103,203	2328043006	MPX FILTER	
L106,206	2328044005	BAND TRAP FILTER	
T301	2398016005	OSC COIL	
J303	2048108001	MIC JACK	
J301	2048109000	HEAD PHONE JACK	
J302	2048114008	4P PIN JACK	
CN101,201	2032075001	2P CONNECTOR BASE	
CN302	2035622008	3P MINI CONNE PIN	
CN301,303	2035622024	4P MINI CONNE PIN	
CN307	2050170001	12P BOARD PIN BASE	DR-M3 only
CN306	2031638012	2P EI CON WITH WIRE	
CN305	2047788008	12P EI CON ASS'Y	
CN304	2045404009	9P EI CON WITH WIRE	

- The carbon resistors rated at ¼W are not listed herein.

KU-0450B INPUT VOLUME UNIT

Ref. No.	Part No.	Part Name	Remarks
VR302	2118072106	J10001H10CA503	50KΩA

KU-0451 CTS UNIT

Ref. No.	Part No.	Part Name	Remarks
IC701	2620346003	HD44750A42	
IC703	2630161003	UPC358C	
IC501,601 702,704	2630229000	LA6458DS	
TR501~511 601~611 702~712	2730245023	2SC2603E/F	
D503,504 603,604	2760001004	1N34A	
D501,502 601,602, 701	2760049008	1S2076	
			Variable resistor
Vr501,601	2116004024	V08QB202	2KΩB
			Ceramic
C504,604	2531002009	CK45B1H471K	470PF 50V
CB701,702	2531151002	CK99B1H102MP4	0.001μF 50V
			Electrolitic
C704	2544130007	CE04W1A101=	100μF 10V
C507,508 512,607 608,612	2544132005	CE04W1C100=	10μF 16V
C701,703	2544134003	CE04W1C330=	33μF 16V
C506,509 513,606 609,613	2544140000	CE04W1V4R7=	4.7μF 35V
			Film
C503,603	2551060005	CQ93M1H102K	0.001μF 50V
C505,605	2551061004	CQ93M1H122K	0.0012μF 50V
C610,611	2551062003	CQ93M1H152K	0.0015μF 50V
C502,602	2551063002	CQ93M1H182K	0.0018μF 50V
C501,601	2551066009	CQ93M1H332K	0.0033μF 50V
C510,511	2551074004	CQ93M1H153K	0.015μF 50V
C702	2551079009	CQ93M1H393K	0.039μF 50V
S701	2129190103	SLIDE SWITCH	
L501,601	2310825009	BIAS FILTER	
CN701	2035622037	8P MINI CONNE PIN	
C702,703	2050171000	12 PIN BOARD CONTACT	

- The carbon resistors rated at ¼W are not listed herein.

KU-0452 FL METER UNIT

Ref. No.	Part No.	Part Name	Remarks
FL801	3939176002	FL METER	
	4418997002	METER HOLDER	
IC801	9ZLBL141	LBL-141	
TR801~804	9Z2SA733	2SA733	
TR805	2730130002	2SC945P	
D802	2760038006	1S1588	
D801	9ZRD5.1EB	RD5.1EB	
			Variable resistor
Vr801,802	2116000044	V08PB503	50KΩB
			Ceramic
C801,802 805	2539015001	CK45B=1E104M	0.1μF 25V
			Electrolitic
C807	2544138009	CE04W1E470M	47μF 10V
C803,804	2544140000	CE04W1V4R7M	4.7μF 35V
C806	2549014021	CE04W1HR33M	0.33μF 50V
C809	2544145005	CE04W1HR47M	0.47μF 50V
C808	2544089006	CE04W1H010M	1μF 50V
CN801	2035622024	4P MINI CONNE PIN	
CN802	2035622053	12P MINI CONNE PIN	

- The carbon resistors rated at ¼W are not listed herein.

KU-0453 FL COUNTER UNIT

Ref. No.	Part No.	Part Name	Remarks
FL401	9ZFG46C5	FL COUNTER	
	4418993006	COUNTER HOLDER	
IC401	9ZHD38750A	HD38750A38	
IC402	9ZHD14069U	HD14069UBP	
IC403	9ZHD7406	HD7406	
TR401,402	2730198002	2SC1815Y	
D401~403	9Z1SS53	1SS53	
XT401	9ZCSB400P	CERAMIC RESONATOR	
			Ceramic
C402	2533629008	CC45SL1H121J	120PF 50V
C403	2536430003	CC45SL1H471J	470PF 50V
			Electrolitic
C404	2544134003	CE04W1C330=	33μF 16V
C401	2544164002	CE04W1E4R7=	4.7μF 25V
CN402	2032075001	2P CONNECTOR BASE	
CN403	2035622082	6P MINI CONNE PIN	
CO401	2035622095	9P MINI CONNE PIN	

- The carbon resistors rated at ¼W are not listed herein.

KU-0452-1 FL METER UNIT

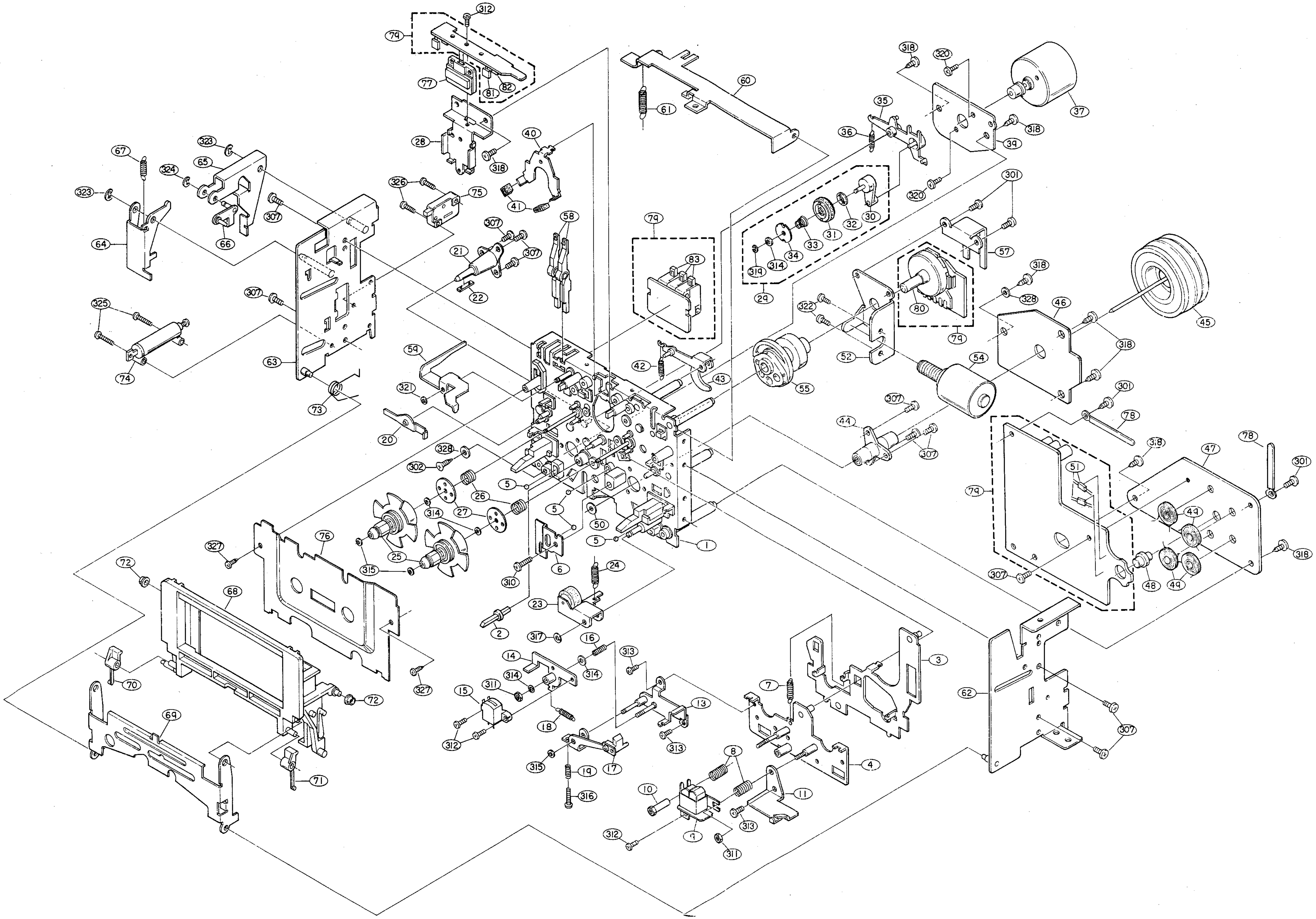
Ref. No.	Part No.	Part Name	Remarks
FL801	3939176002	FL METER	
	4418997002	METER HOLDER	
IC801	9ZLBL142	LBL-142	
TR801~803	9Z2SA733	2SA733	
			Variable resitor
Vr801,802	2116000044	V08PB503	50KΩB
			Ceramic
C801,802 805	2539015001	CK45B=1E104M	0.1μF 25V
			Electrolitic
C803,804	2544132005	CE04W1C100M	10μF 16V
C806	2549014021	CE04W1HR33M	0.33μF 50V
CN801	2035622024	4P MINI CONNE PIN	
CN802	2035622053	12P MINI CONNE PIN	

- The carbon resistors rated at ¼W are not listed herein.

KU-0454/0454-1 CONTROL UNIT

Ref. No.	Part No.	Part Name	Remarks
R451	2412072006	RD14B2E151J	KU-0454
R452	2412076002	RD14B2E221J	KU-0454
S451	2129213103	PUSH SWITCH	3 KEY
S452	2129214102	PUSH SWITCH	2 KEY
S453~461	2124388004	TACT SWITCH	KU-0454
S453~458 461	2124388004	TACT SWITCH	KU-0454-1
LD451	3939180001	LED (RED)	
LD452,456	3939181000	LED (AMBER)	KU-0454
LD452	3939181000	LED (〃)	KU-0454-1
LD453~455	3939182009	LED (GREEN)	KU-0454
LD453	3939182009	LED (〃)	KU-0454-1
CN452	2041631009	6P EI CON ASS'Y	
CN453	2045400003	8P EI CON ASS'Y	KU-0454
CN451	2045401002	12P EI CON ASS'Y	
	4438693205	LED GUIDE (A)	
	4438694204	LED GUIDE (B)	KU-0454

EXPLODED VIEW OF MECHANISM UNIT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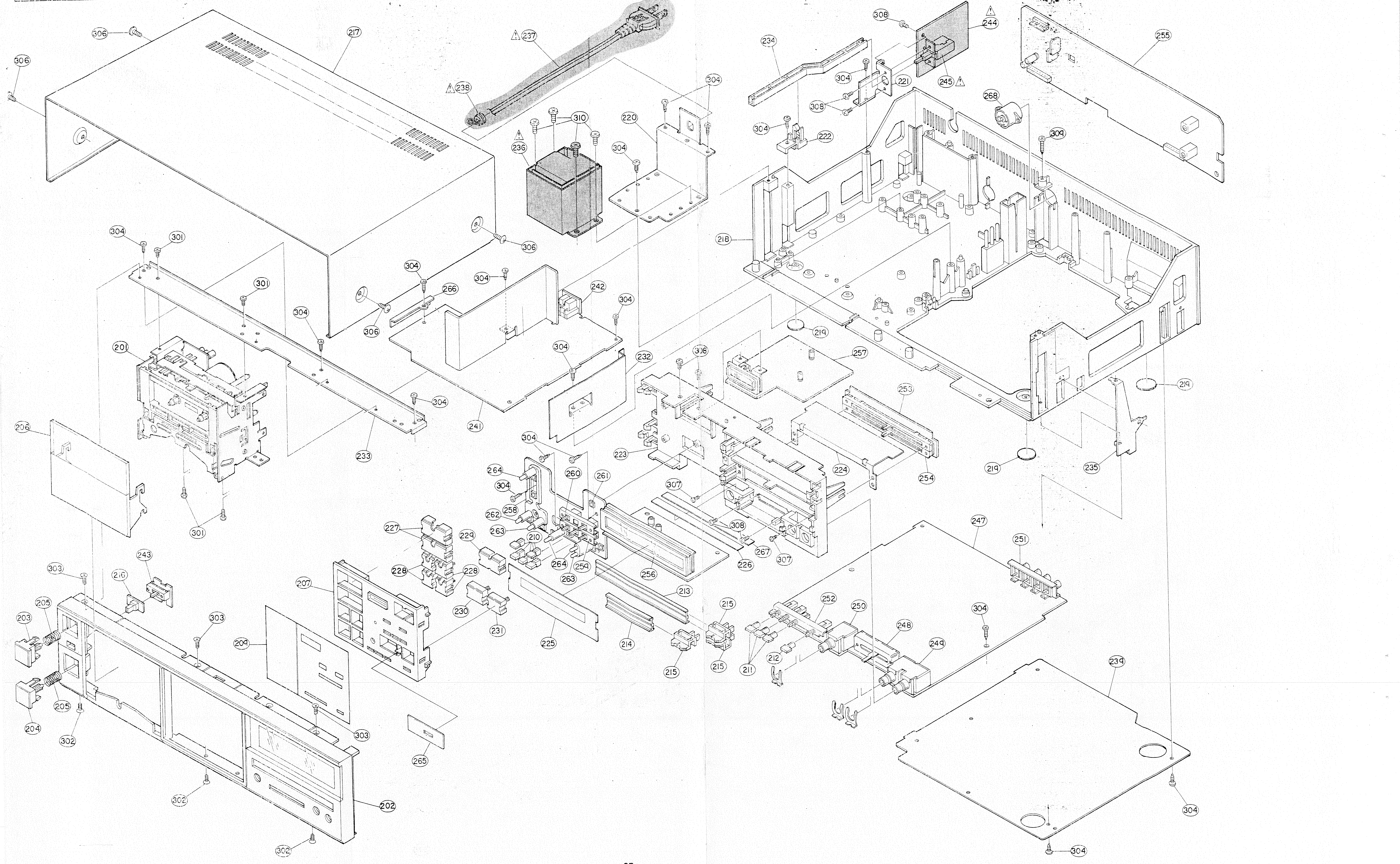
EXPLODED VIEW OF CABINET AND CHASSIS GROUP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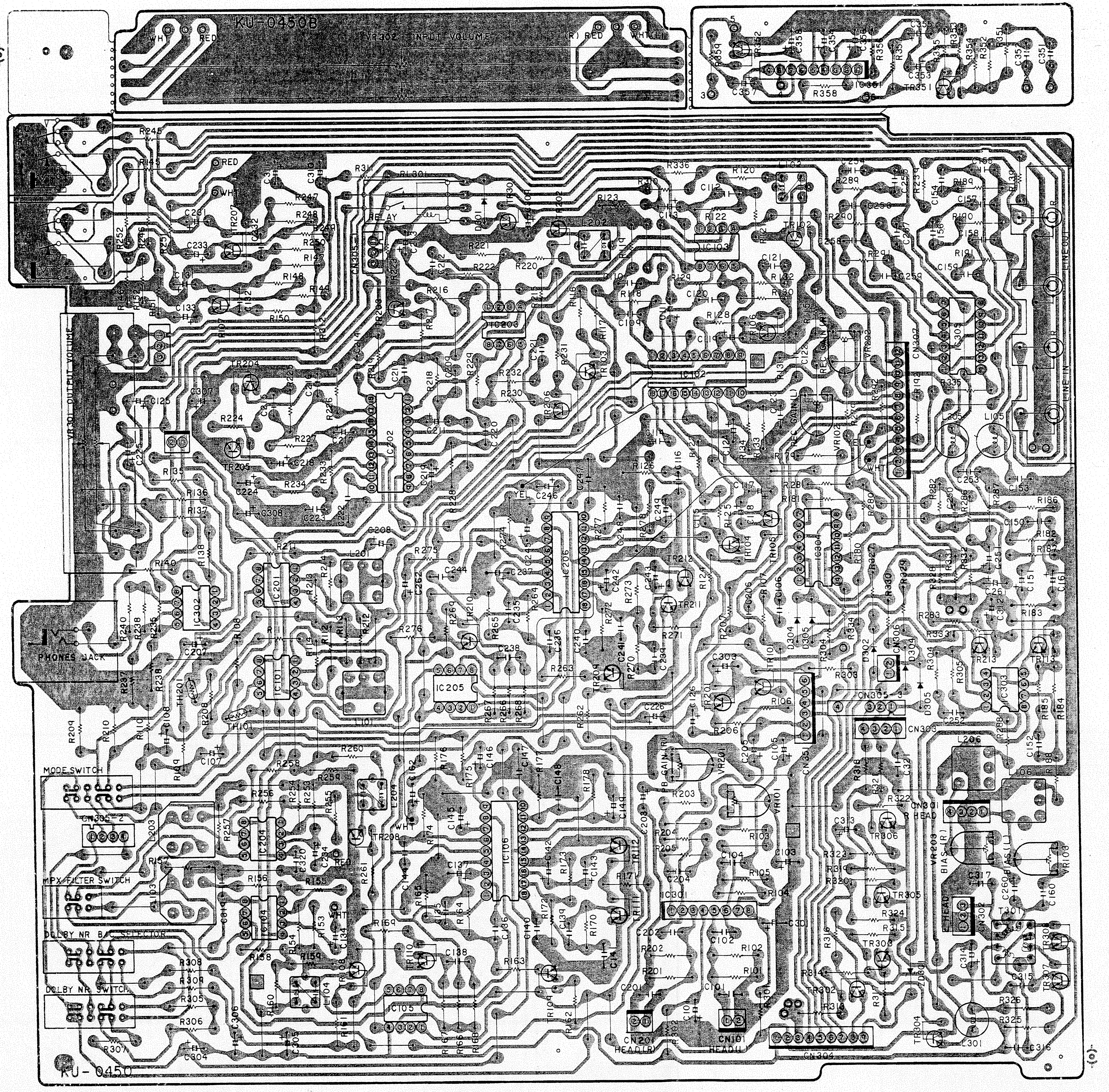
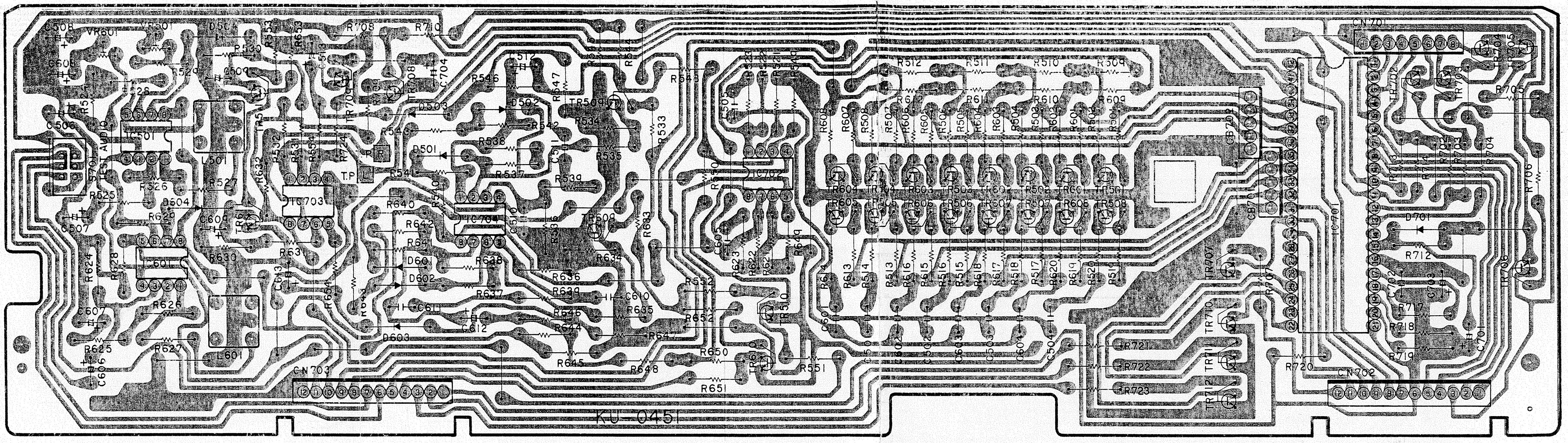
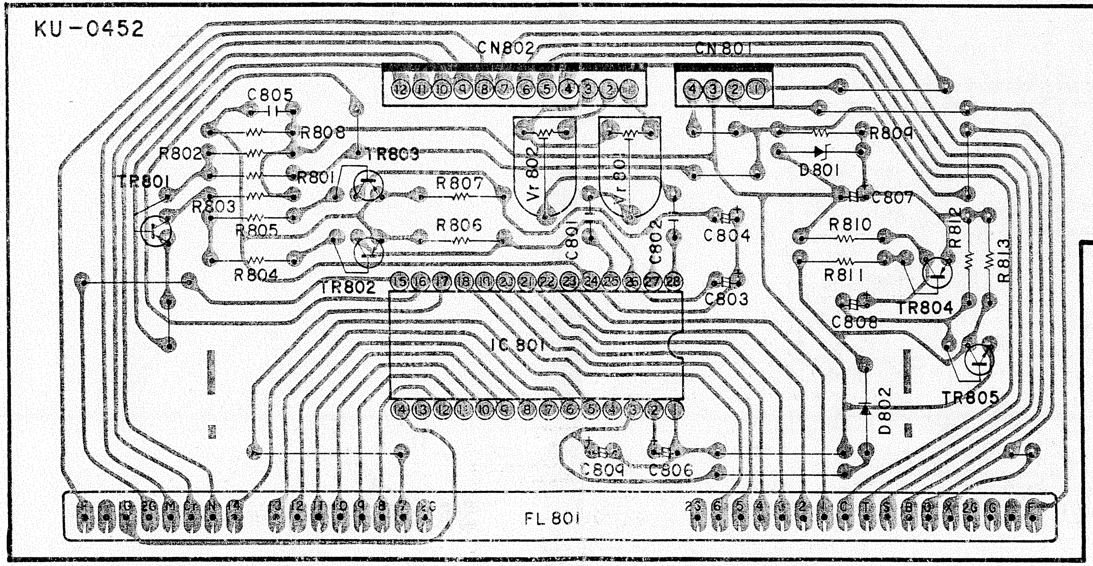
P. W. BOARD OF KU–0450 AUDIO AMP UNIT


KU-0450B
WHT
RED
VR302 INPUT VOLUME
(R) RED
KU-0450
VR301 OUTPUT VOLUME
PHONES JACK
MODE SWITCH
MPX FILTER SWITCH
DOLBY NR BAL SELECTOR
DOLBY NR SWITCH
RELAY
LINE OUT
LINE IN
CN201 HEAD(R)
CN101 HEAD(L)
CN304
CN301 R HEAD
BIAS
IC101
IC102
IC103
IC104
IC105
IC106
IC201
IC202
IC203
IC204
IC205
IC301
IC302
IC303
L101
L105
L106
L301

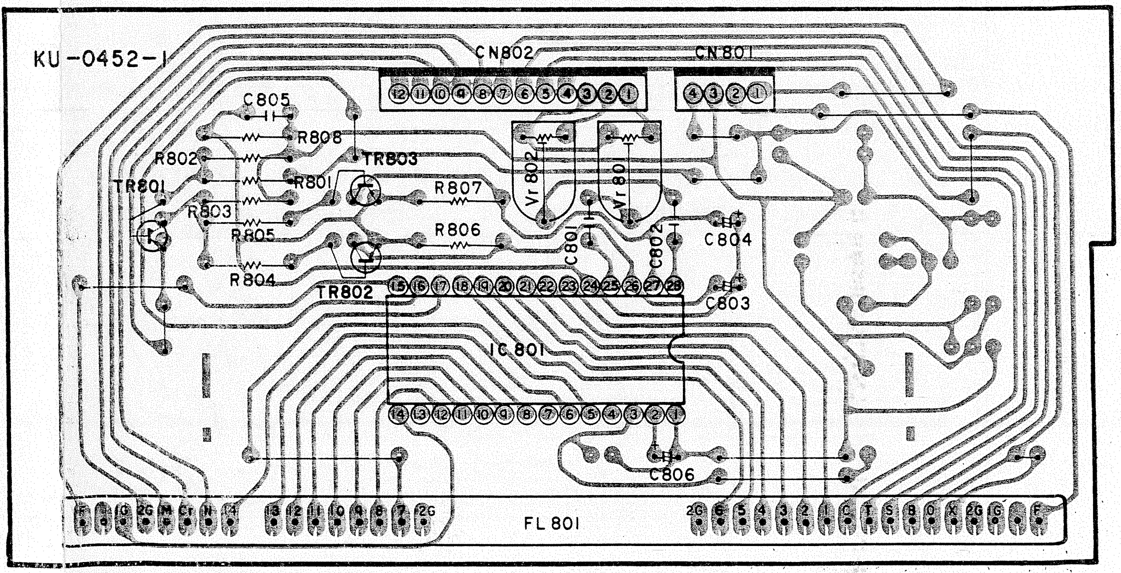
P. W. BOARD OF KU–0451 CTS UNIT


KU–0451
CN703
CN701
CN702
IC701
IC702
IC703
IC704
VR601
TR504
TR509
TR701
TR707
TR710
TR711
TR712
D501
D502
D503
D601
D602
D603
D701
L501
L601
T.P
R512
R511
R510
R509
R705
R712
R717
R718
R719
R720
R721
R722
R723
R645
R648
R650
R651
R551
R552
R652
C701
C610
C612

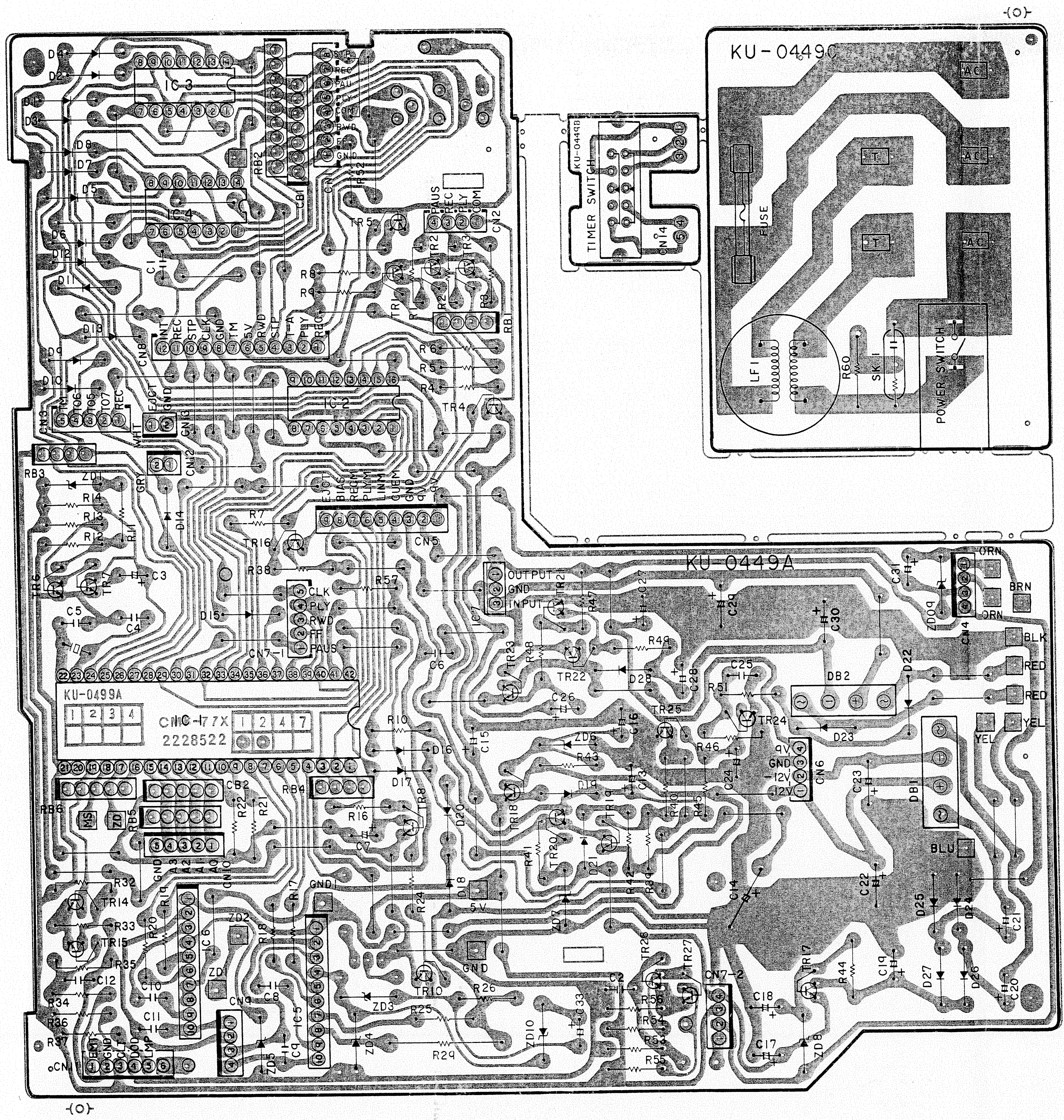
P. W. BOARD OF KU–0452 FL METER UNIT


KU–0452
CN802
CN801
C805
R802
R808
TR803
R809
TR801
R801
R807
Vr 802
Vr 801
D801
C807
R803
R805
R806
C801
C802
C804
R810
R812
R813
R804
TR802
R811
C803
TR804
C808
IC 801
D802
TR805
C809
C806
FL 801

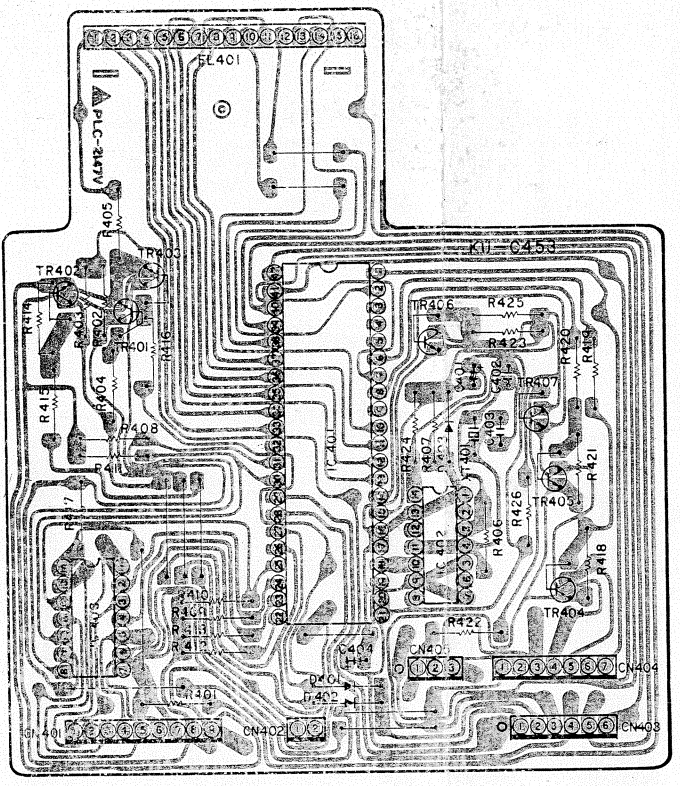
P. W. BOARD OF KU–0452-1 FL METER UNIT


KU–0452–1
CN802
CN801
C805
R802
R808
TR803
TR801
R801
R807
Vr 802
Vr 801
R803
R805
R806
C801
C802
C804
R804
TR802
C803
IC 801
C806
FL 801

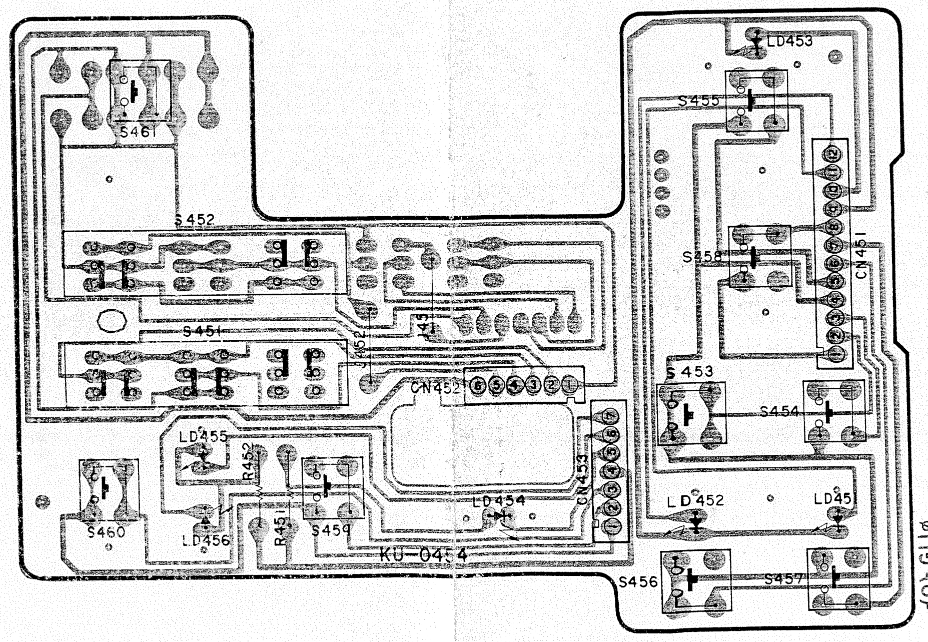
P. W. BOARD OF KU–0449 LOGIC AND POWER UNIT


KU-0449C
KU-0449B
KU-0449A
KU-0499A
TIMER SWITCH
FUSE
POWER SWITCH
LF1
R60
SK
AC
T
IC3
IC4
IC2
IC5
IC6
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN7-2
CN8
CN9
CN12
DB1
DB2
ORN
BRN
BLK
RED
YEL
BLU
WHT
OUTPUT
GND
INPUT
9V
12V
5V
CIC-177X
2228522
-(O)-

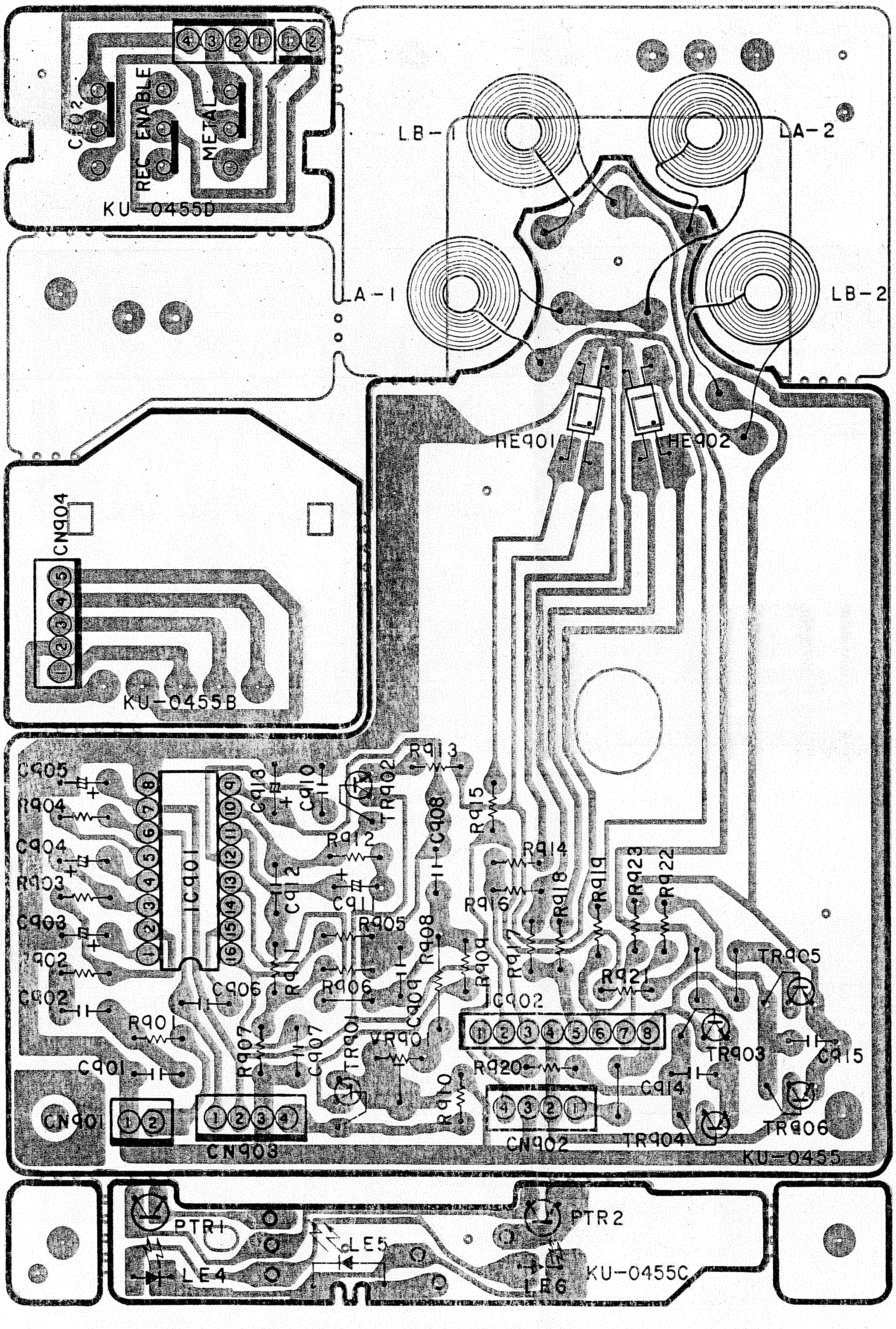
P. W. BOARD OF KU-0453 FL COUNTER UNIT


FL401
KU-0453
IC401
IC402
TR401
TR402
TR403
TR404
TR405
TR406
TR407
CN401
CN402
CN403
CN404
GL401
D401
D402

P. W. BOARD OF KU-0454 CONTROL UNIT

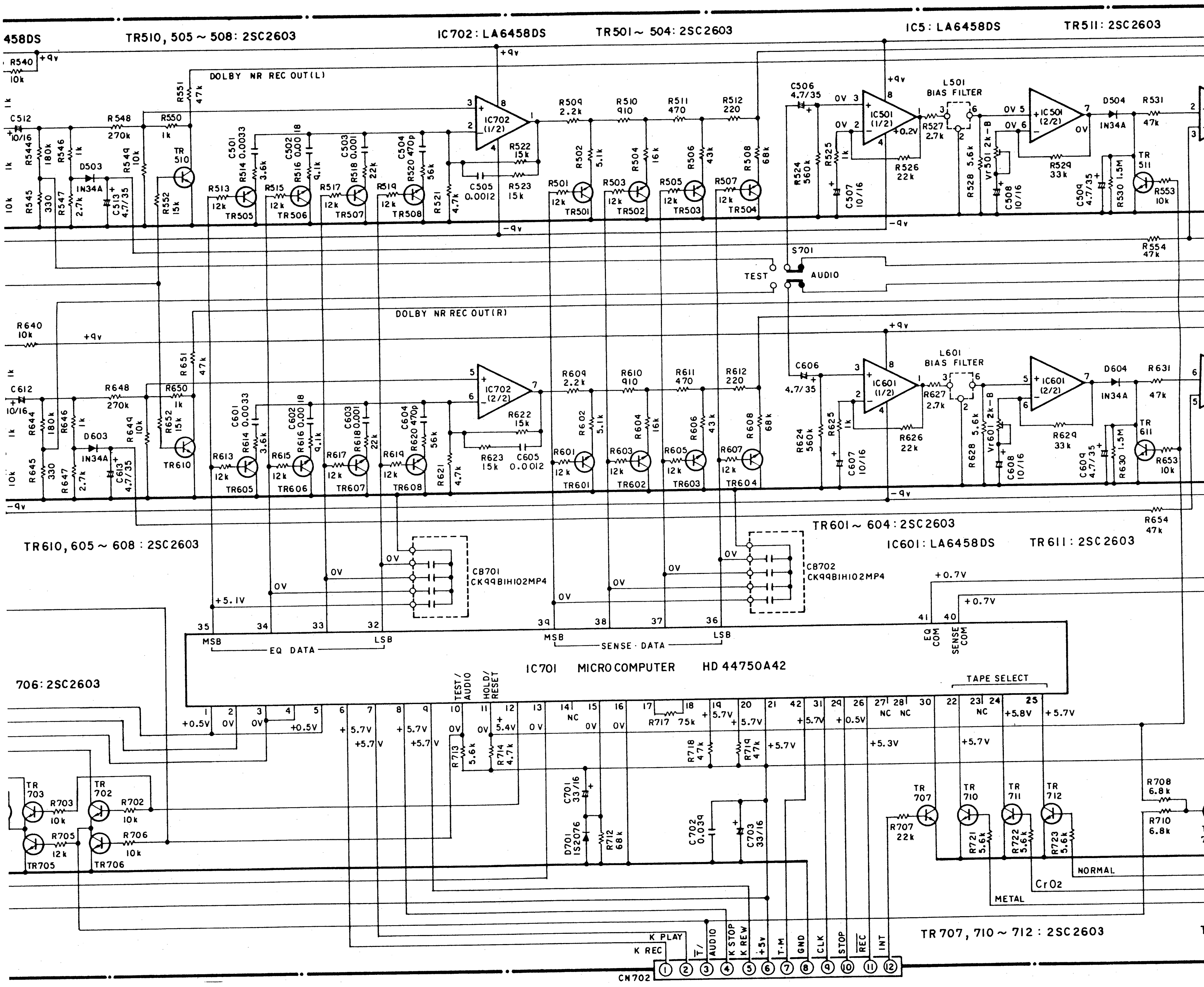

KU-0454
S451
S452
S453
S454
S455
S456
S457
S458
S459
S460
S461
LD451
LD452
LD453
LD454
LD455
LD456
CN451
CN452
CN453
-(O)- G11

P. W. BOARD OF KU–0455 CAPSTAN SERVO UNIT



REC ENABLE
METAL
C102
KU–0455D
LB–1
LA–2
LA–1
LB–2
HE901
HE902
CN904
KU–0455B
C905
R904
C904
R903
C903
R902
C902
R901
C901
CN901
CN903
IC901
C913
C910
TR902
R913
R912
C911
C912
R905
R911
R906
C906
R907
C907
TR901
VR901
C909
R908
R909
R910
C908
R915
R914
R916
R917
R918
R919
R923
R922
R921
IC902
R920
CN902
C914
TR903
TR904
TR905
TR906
C915
KU–0455
PTR1
PTR2
LE4
LE5
LE6
KU–0455C

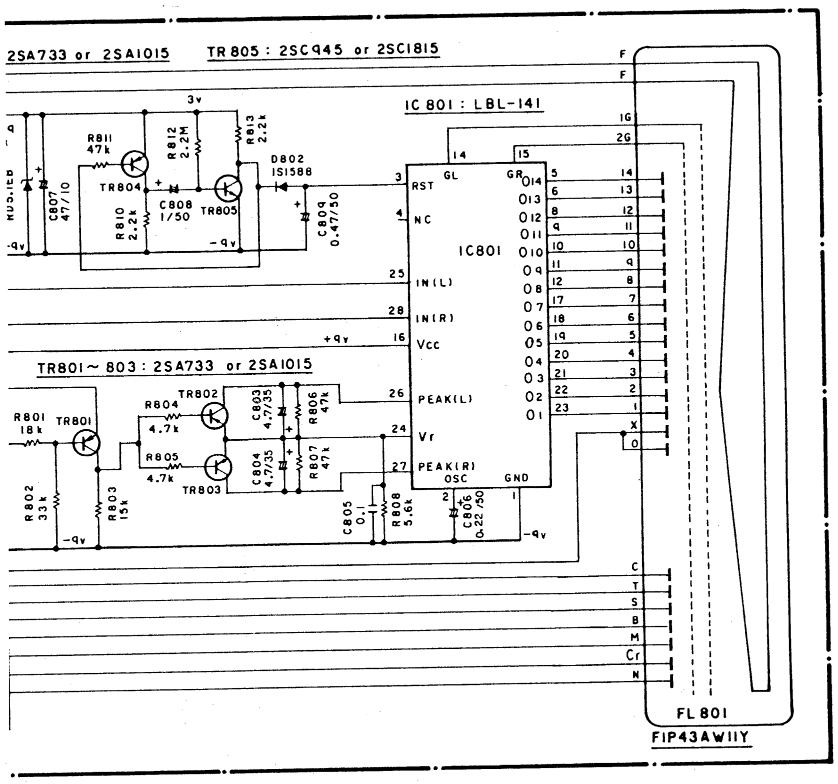
F CTS UNIT



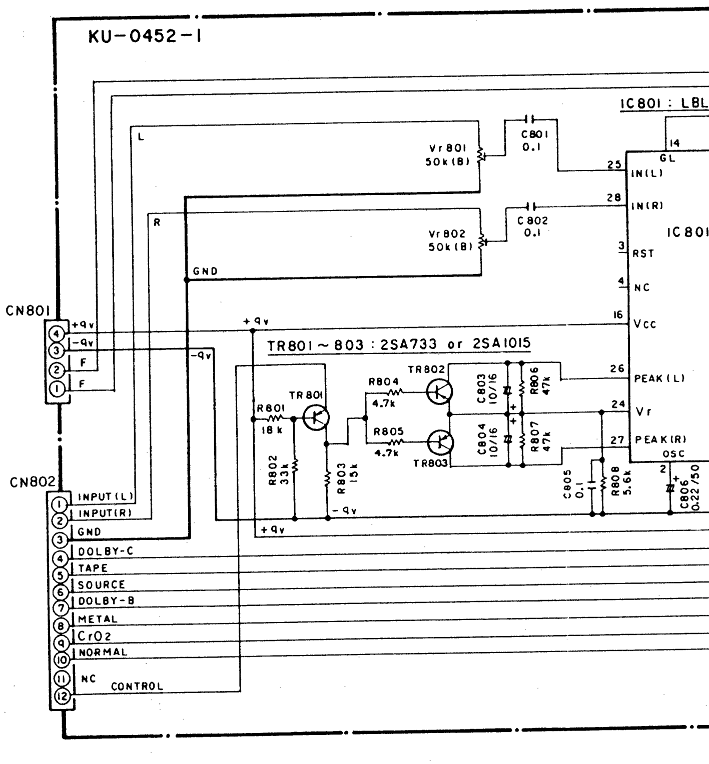
458DS
TR510, 505 ~ 508: 2SC2603
IC702: LA6458DS
TR501 ~ 504: 2SC2603
IC5: LA6458DS
TR511: 2SC2603
DOLBY NR REC OUT(L)
L501 BIAS FILTER
IC501 (1/2)
IC501 (2/2)
IC702 (1/2)
S701
TEST
AUDIO
DOLBY NR REC OUT(R)
L601 BIAS FILTER
IC601 (1/2)
IC601 (2/2)
IC702 (2/2)
TR610, 605 ~ 608 : 2SC2603
TR601 ~ 604: 2SC2603
IC601: LA6458DS
TR611: 2SC2603
CB701 CK99B1H102MP4
CB702 CK99B1H102MP4
MSB
EQ DATA
LSB
SENSE · DATA
IC701 MICROCOMPUTER HD 44750A42
TEST/AUDIO
HOLD/RESET
EQ COM
SENSE COM
TAPE SELECT
706: 2SC2603
TR703
TR702
TR705
TR706
TR707
TR710
TR711
TR712
NORMAL
CrO2
METAL
K PLAY
K REC
T/
AUDIO
K STOP
K REW
+5v
T-M
GND
CLK
STOP
REC
INT
CN702
TR707, 710 ~ 712 : 2SC2603

AM OF FL METER UNIT

(DR–M3)

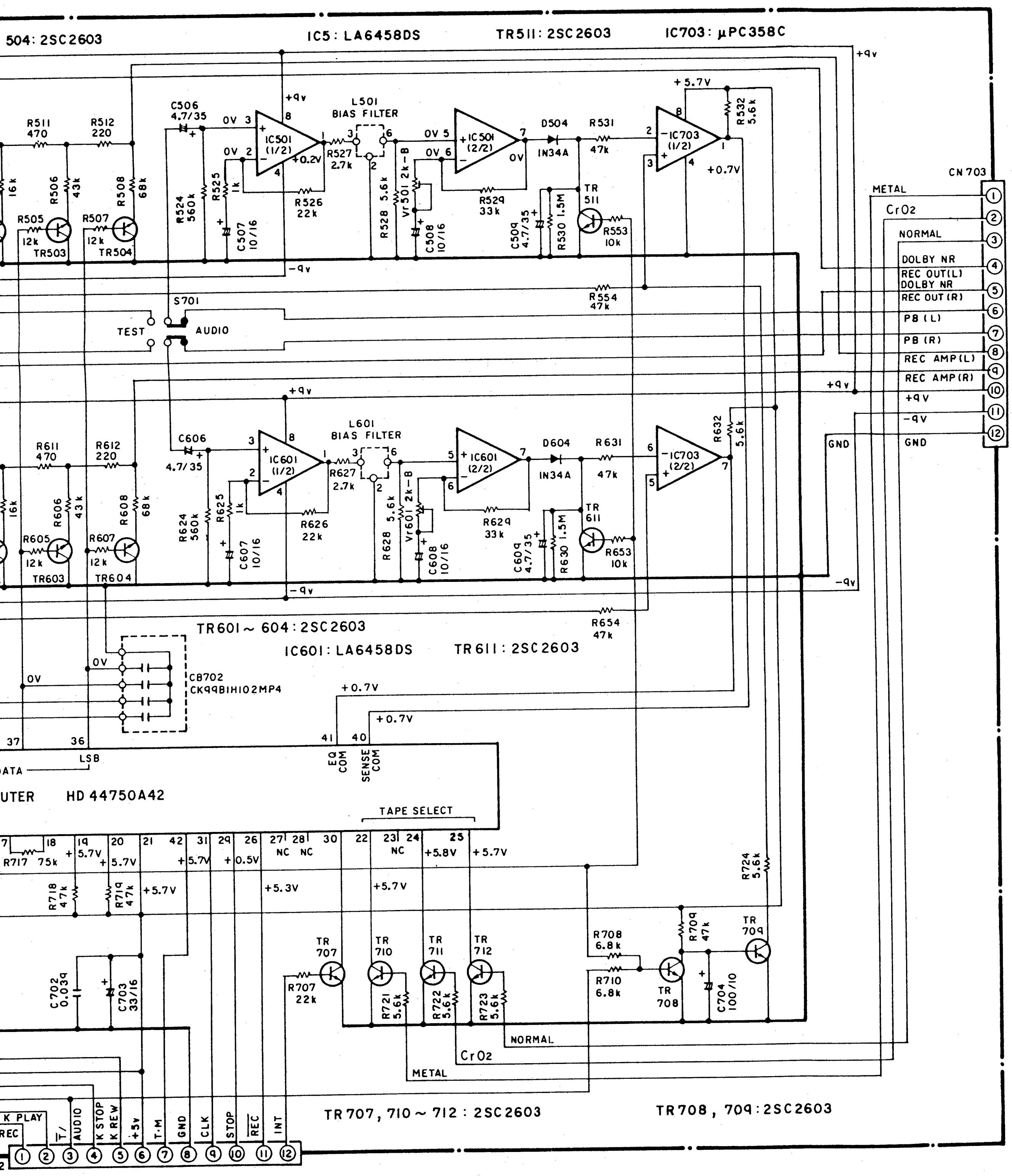


2SA733 or 2SA1015
TR805 : 2SC945 or 2SC1815
IC801 : LBL-141
TR804
TR805
D802 1S1588
IC801
RST
NC
IN(L)
IN(R)
Vcc
PEAK(L)
Vr
PEAK(R)
OSC
GND
TR801 ~ 803 : 2SA733 or 2SA1015
TR801
TR802
TR803
FL801
FIP43AW11Y

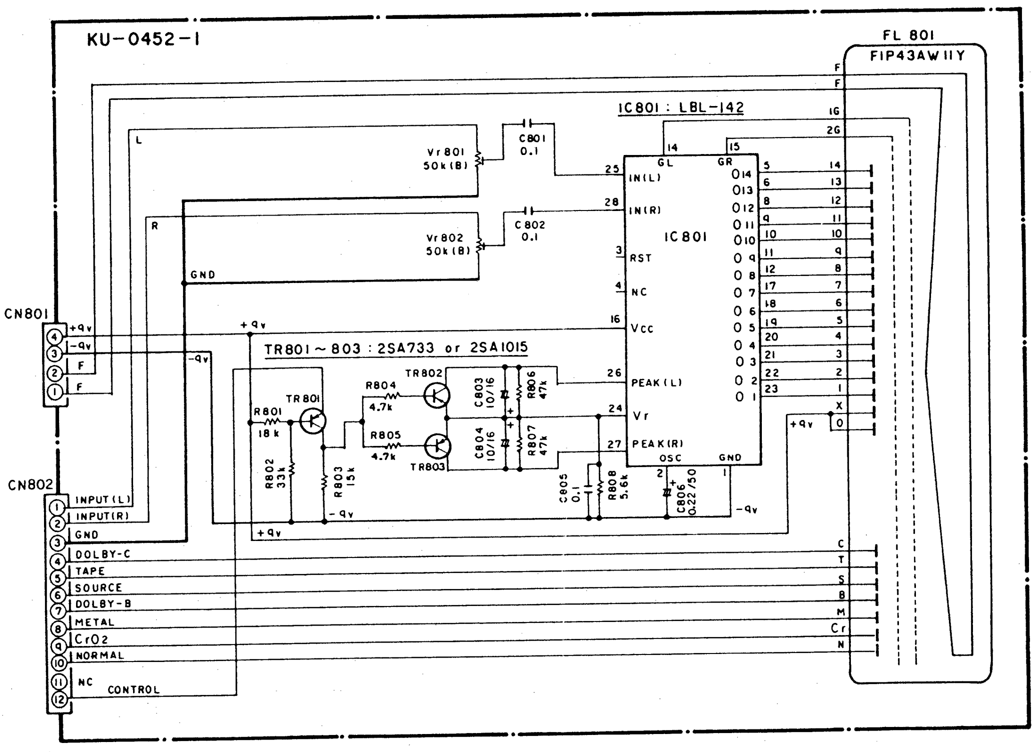


KU-0452-1
IC801 : LBL
IC801
CN801
CN802
TR801 ~ 803 : 2SA733 or 2SA1015
TR801
TR802
TR803
INPUT(L)
INPUT(R)
GND
DOLBY-C
TAPE
SOURCE
DOLBY-B
METAL
CrO2
NORMAL
NC
CONTROL

Note:
- Resistance shall be 1/4W unle
unit is Ω.
- The unit of capacitor is μF, P
- This circuit diagram shows the
change for the purpose of impro

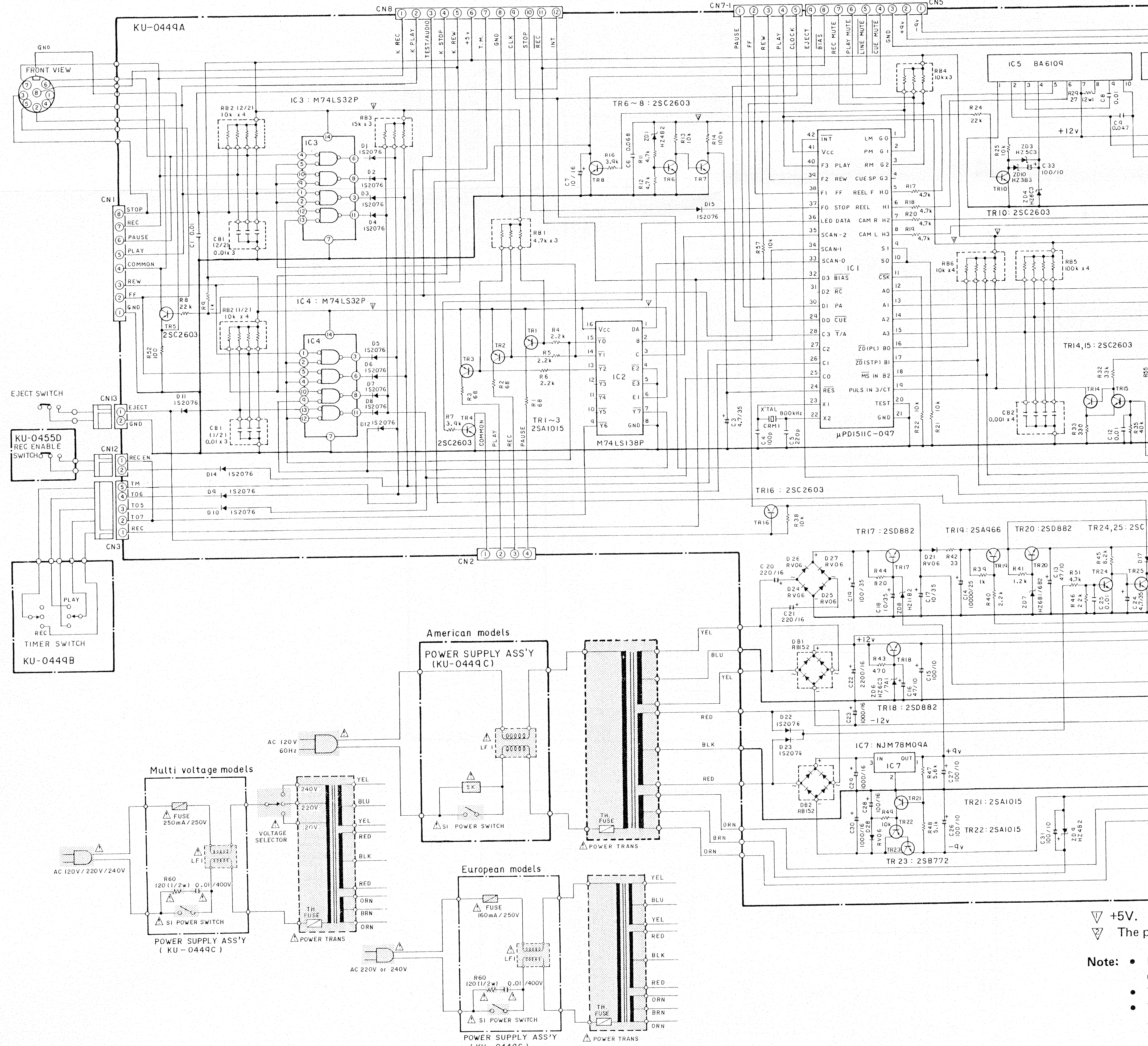

504: 2SC2603
IC5: LA6458DS
TR511: 2SC2603
IC703: μPC358C
+9v
+5.7V
C506 4.7/35
L501 BIAS FILTER
IC501 (1/2)
IC501 (2/2)
IC703 (1/2)
D504 IN34A
R531 47k
R532 5.6k
R511 470
R512 220
R506 43k
R508 68k
R505 12k
R507 12k
TR503
TR504
R524 560k
R525 1k
C507 10/16
R526 22k
R527 2.7k
R528 5.6k
Vr501 2k-B
C508 10/16
R529 33k
C509 4.7/35
R530 1.5M
TR 511
R553 10k
+0.2V
+0.7V
-9v
S701
TEST
AUDIO
R554 47k
CN 703
METAL
CrO2
NORMAL
DOLBY NR
REC OUT(L)
DOLBY NR
REC OUT (R)
PB (L)
PB (R)
REC AMP(L)
REC AMP(R)
+9V
-9V
GND
C606 4.7/35
L601 BIAS FILTER
IC601 (1/2)
IC601 (2/2)
IC703 (2/2)
D604 IN34A
R631 47k
R632 5.6k
R611 470
R612 220
R606 43k
R608 68k
R605 12k
R607 12k
TR603
TR604
R624 560k
R625 1k
C607 10/16
R626 22k
R627 2.7k
R628 5.6k
Vr601 2k-B
C608 10/16
R629 33k
C609 4.7/35
R630 1.5M
TR 611
R653 10k
R654 47k
TR601 ~ 604: 2SC2603
IC601: LA6458DS
TR611: 2SC2603
CB702 CK99B1H102MP4
0V
+0.7V
37
36
41
40
EQ COM
SENSE COM
DATA
LSB
UTER HD 44750A42
TAPE SELECT
R717 75k
+5.7V
+0.5V
+5.3V
+5.8V
NC
R718 47k
R719 47k
C702 0.039
C703 33/16
TR 707
TR 710
TR 711
TR 712
R707 22k
R721 5.6k
R722 5.6k
R723 5.6k
R708 6.8k
R709 47k
R710 6.8k
TR 708
TR 709
C704 100/10
R724 5.6k
NORMAL
CrO2
METAL
K PLAY
REC
K STOP
K REW
AUDIO
+5v
T-M
GND
CLK
STOP
REC
INT
TR707, 710 ~ 712 : 2SC2603
TR708, 709: 2SC2603

(DR–M2)


KU-0452-1
FL 801
FIP43AW11Y
IC801 : LBL-142
Vr801 50k(B)
Vr802 50k(B)
C801 0.1
C802 0.1
IN(L)
IN(R)
RST
NC
VCC
PEAK(L)
Vr
PEAK(R)
OSC
GND
IC801
CN801
+9v
-9v
F
L
R
GND
TR801 ~ 803 : 2SA733 or 2SA1015
R801 18k
R802 33k
R803 15k
R804 4.7k
R805 4.7k
TR801
TR802
TR803
C803 10/16
C804 10/16
R806 47k
R807 47k
C805 0.1
R808 5.6k
C806 0.22/50
CN802
INPUT(L)
INPUT(R)
GND
DOLBY-C
TAPE
SOURCE
DOLBY-B
METAL
CrO2
NORMAL
NC
CONTROL

Note:
- Resistance shall be 1/4W unless otherwise specified and the unit is Ω.
- The unit of capacitor is μF, P is pF unless otherwise specified.
- This circuit diagram shows the basic circuit. It is subject to change for the purpose of improvement.

SCHEMATIC DIAGRAM OF LOGIC AND POWER UNIT



KU-0449A
FRONT VIEW
GND
CN8
K REC
K PLAY
TEST/AUDIO
K STOP
K REW
+5V
T.M.
GND
CLK
STOP
REC
INT
CN7-1
PAUSE
FF
REW
PLAY
CLOCK
EJECT
BIAS
REC MUTE
PLAY MUTE
LINE MUTE
CUE MUTE
GND
+9V
-9V
CN5
IC5 BA6109
IC3 : M74LS32P
IC4 : M74LS32P
TR6 ~ 8 : 2SC2603
RB2 (2/2) 10k x 4
RB3 15k x 3
RB1 4.7k x 3
RB84 10k x 3
RB5 100k x 4
RB6 10k x 4
CN1
STOP
REC
PAUSE
PLAY
COMMON
REW
FF
GND
TR5 2SC2603
CB1 (2/2) 0.01 x 3
CB1 (1/2) 0.01 x 3
RB2 (1/2) 10k x 4
D1 ~ D12 1S2076
D15 1S2076
IC1
μPD1511C-097
IC2
M74LS138P
TR1 ~ 3 2SA1015
TR4 2SC2603
X'TAL 800kHz
TR10 : 2SC2603
TR14,15 : 2SC2603
TR16 : 2SC2603
EJECT SWITCH
CN13
EJECT
KU-0455D
REC ENABLE SWITCH
CN12
REC EN
TM
T06
T05
T07
REC
CN3
CN2
PLAY
REC
TIMER SWITCH
KU-0449B
TR17 : 2SD882
TR19 : 2SA966
TR20 : 2SD882
TR24,25 : 2SC
TR18 : 2SD882
IC7 : NJM78M09A
TR21 : 2SA1015
TR22 : 2SA1015
TR 23 : 2SB772
+12V
-12V
+9V
-9V
American models
POWER SUPPLY ASS'Y (KU-0449C)
AC 120V 60Hz
LF1
SK
S1 POWER SWITCH
TH. FUSE
POWER TRANS
YEL
BLU
RED
BLK
ORN
BRN
Multi voltage models
FUSE 250mA/250V
R60 120 (1/2W) 0.01/400V
AC 120V/220V/240V
VOLTAGE SELECTOR
240V
220V
120V
POWER SUPPLY ASS'Y (KU-0449C)
European models
FUSE 160mA/250V
AC 220V or 240V

▽ +5V.

▽ The p

Note: •

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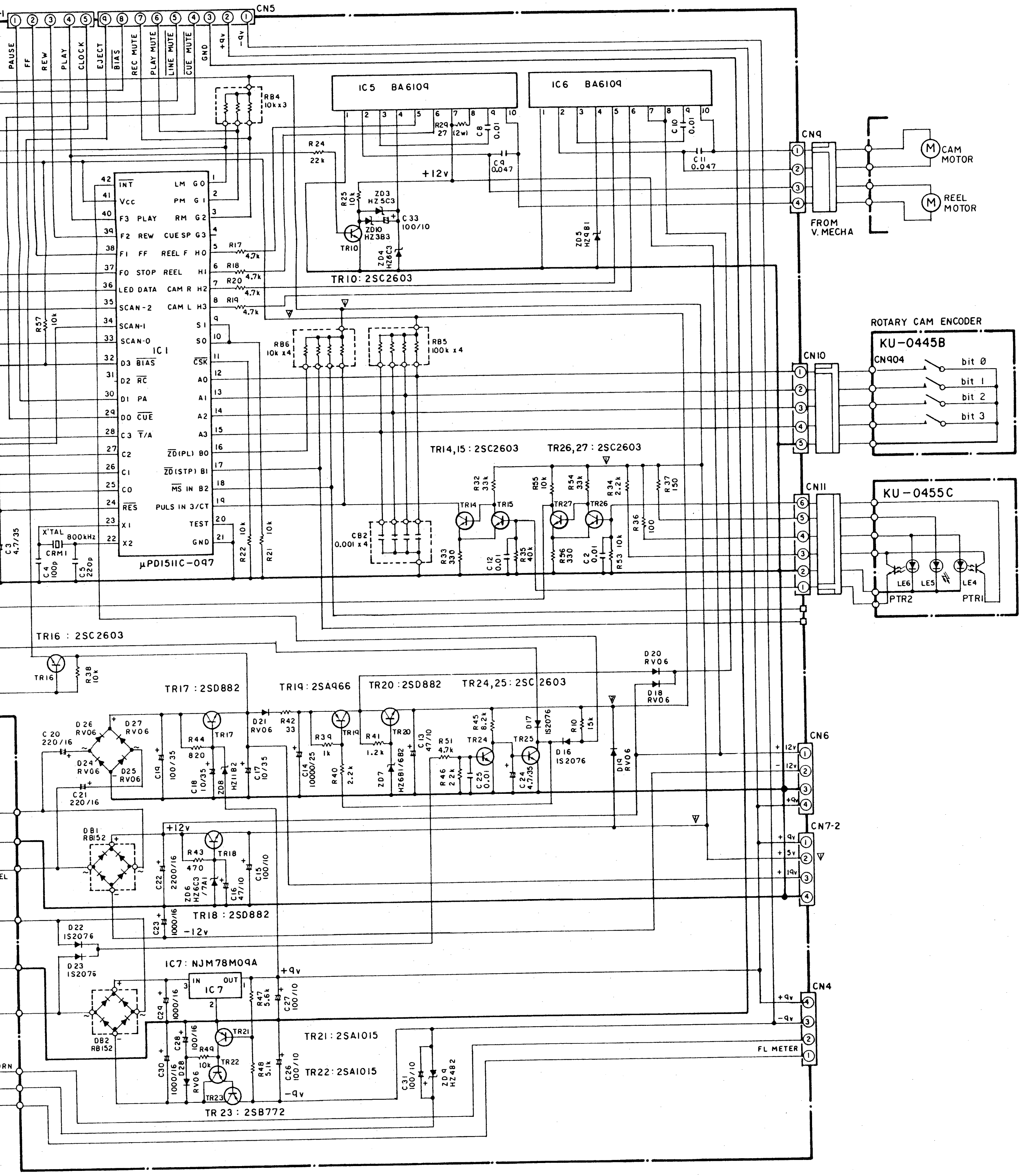

CN5
PAUSE
FF
REW
PLAY
CLOCK
EJECT
BIAS
REC MUTE
PLAY MUTE
LINE MUTE
CUE MUTE
GND
+9v
-9v
R84 10k x3
IC5 BA6109
IC6 BA6109
R24 22k
R29 27 (2W)
C8 0.01
C9 0.047
C10 0.01
C11 0.047
+12v
R25 10k
ZD3 HZ5C3
ZD10 HZ3B3
C33 100/10
TR10
ZD4 HZ6C3
ZD5 HZ9B1
TR10: 2SC2603
CN9
CAM MOTOR
REEL MOTOR
FROM V. MECHA
INT
Vcc
F3 PLAY
F2 REW
F1 FF
F0 STOP
LED DATA
SCAN-2
SCAN-1
SCAN-0
D3 BIAS
D2 RC
D1 PA
D0 CUE
C3 T/A
C2
C1
C0
RES
X1
X2
LM G0
PM G1
RM G2
CUE SP G3
REEL F H0
REEL H1
CAM R H2
CAM L H3
S1
S0
CSK
A0
A1
A2
A3
ZD(PL) B0
ZD(STP) B1
MS IN B2
PULS IN 3/CT
TEST
GND
IC1
μPD1511C-097
R17 4.7k
R18 4.7k
R20 4.7k
R19 4.7k
R57 10k
X'TAL 800kHz
CRM1
C3 4.7/35
C4 100p
C5 220p
R22 10k
R21 10k
R86 10k x4
R85 100k x4
CB2 0.001 x4
ROTARY CAM ENCODER
KU-0445B
CN904
bit 0
bit 1
bit 2
bit 3
CN10
TR14,15: 2SC2603
TR26,27: 2SC2603
R32 33k
R55 10k
R54 33k
R34 2.2k
R37 150
R36 100
R33 330
C12 0.01
R35 40k
R56 330
C2 0.01
R53 10k
TR14
TR15
TR27
TR26
CN11
KU-0455C
LE6
LE5
LE4
PTR2
PTR1
TR16: 2SC2603
TR16
R38 10k
TR17: 2SD882
TR19: 2SA966
TR20: 2SD882
TR24,25: 2SC2603
D20 RV06
D18 RV06
C20 220/16
D26 RV06
D27 RV06
D24 RV06
D25 RV06
C21 220/16
R44 820
TR17
D21 RV06
R42 33
R39 1k
TR19
R41 1.2k
TR20
C19 100/35
C18 10/35
ZD8 HZ11B2
C17 10/35
C14 10000/25
R40 2.2k
ZD7 HZ6B1/6B2
C13 47/10
R51 4.7k
R45 8.2k
TR24
R46 2.2k
C25 0.01
D17 1S2076
TR25
C24 4.7/25
R10 15k
D16 1S2076
D19 RV06
CN6
+12v
-12v
+9v
CN7-2
+9v
+5v
+12v
DB1 RB152
+12v
R43 470
TR18
C22 2200/16
ZD6 HZ6C3 /7A1
C16 47/10
C15 100/10
C23 1000/16
TR18: 2SD882
-12v
D22 1S2076
D23 1S2076
IC7: NJM78M09A
IN
OUT
IC7
+9v
C29 1000/16
R47 5.6k
C27 100/10
CN4
+9v
-9v
FL METER
DB2 RB152
C28 100/16
TR21
R49 10k
TR22
C30 1000/16
D28 RV06
TR23
R48 5.1k
C26 100/10
TR21: 2SA1015
TR22: 2SA1015
-9v
C31 10/16
ZD9 HZ4B2
TR 23: 2SB772
EL
RN

▽ +5V.

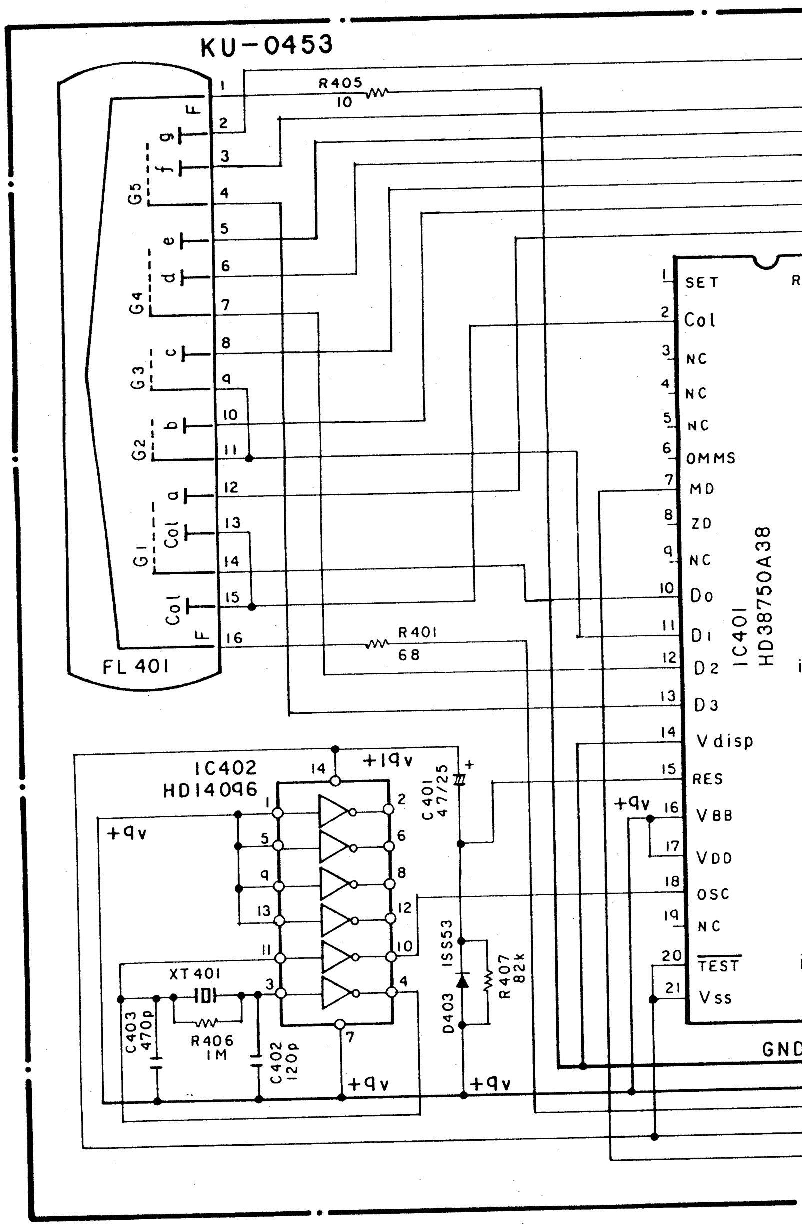
▽ The preserved power supply for the power off stop is

Note:
- Resistance shall be 1/4W unless otherwise specified and the unit is Ω.
- The unit of capacitor is μF, P is pF unless otherwise specified.
- This circuit diagram shows the basic circuit. It is subject to change for the purpose of improvement.

Mechanism-Control Microcomputer Terminal Function Table (IC$_1$: μPD1511C-097)

Terminal number	Name	Input/ output	Function	Terminal voltage (V)		
				STOP	PLAY	REC
1	$\overline{\text{LM}}$	Output	LINE MUTE terminal (Active LOW)	0	–	–
2	PM	Output	PLAY MUTE terminal (Active HIGH)	3.7	0	–
3	RM	Output	REC MUTE terminal (Active HIGH)	3.7	–	0
4	CUE SP (NC)	Output	NON CONNECTION	0	0	0
5	REEL F	Output	REEL MOTOR FORWARD terminal	0	3.6	–
6	REEL R	Output	REEL MOTOR REVERSE terminal	0	–	–
7	$\overline{\text{CAR R}}$	Output	CAM MOTOR RIGHT terminal	3.6	–	–
8	$\overline{\text{CAM L}}$	Output	CAM MOTOR LEFT terminal	3.6	–	–
9	NC		NON CONNECTION	0	–	–
10	NC		NON CONNECTION	0	–	–
11	NC		NON CONNECTION	0	–	–
12	A$_0$	Input	CAM ENCODER DATA terminal	0	0.5	–
13	A$_1$	Input		4.9	–	–
14	A$_2$	Input		4.9	0	–
15	A$_3$	Input		0	4.9	–
16	$\overline{\text{ZE}}$ (PL) (NC)	Input	NON CONNECTION	5.7	–	–
17	$\overline{\text{ZD}}$ (STP) (NC)	Input	NON CONNECTION	5.7	–	–
18	$\overline{\text{MS}}$ IN (NC)	Input	NON CONNECTION	5.7	–	–
19	PULS IN	Input	REEL PULSE terminal	0.6	–	–
20	TEST	Input	Microcomputer TEST terminal	0	–	–
21	GND	Input	GND	0	–	–
22	X$_2$	Input	OSC terminal for the microcomputer	1.9	–	–
23	X$_1$	Input		2.0	–	–
24	$\overline{\text{RES}}$	Input	RESET terminal	4.9	–	–
25	C$_0$	Input	KEY MATRIX input terminal	5.7	–	–
26	C$_1$	Input		5.1	–	–
27	C$_2$	Input		5.0	–	–
28	$\overline{\text{T}}$ / A	Input	TEST/AUDIO terminal	4.6	–	–
29	$\overline{\text{CUE}}$ (NC)	Output		0	0.1	0.1
30	PA	Output	PAUSE STATUS terminal	0.1	–	–
31	$\overline{\text{RC}}$	Output	REC STATUS terminal	0	–	–
32	$\overline{\text{BIAS}}$	Output	BIAS control terminal	5.2	–	0.1
33	LED DATA	Output	LED control terminal	2.0	–	–
34	E$_1$	Output	Output terminal for KEY MATRIX	2.0	–	–
35	E$_2$	Output		2.0	–	–
36	E$_3$	Output		0	0.5	0.9
37	STP	Output	STOP STATUS terminal	5.4	0	0
38	FF	Output	FF STATUS terminal	0.1	–	–
39	FW	Output	REW STATUS terminal	0.1	–	–
40	PL	Output	PLAY STATUS terminal	0.1	3.8	3.8
41	Vcc	Input	Power input terminal +5V	4.9	–	–
42	$\overline{\text{INT}}$	Input	Interrupt terminal	4.9	–	–

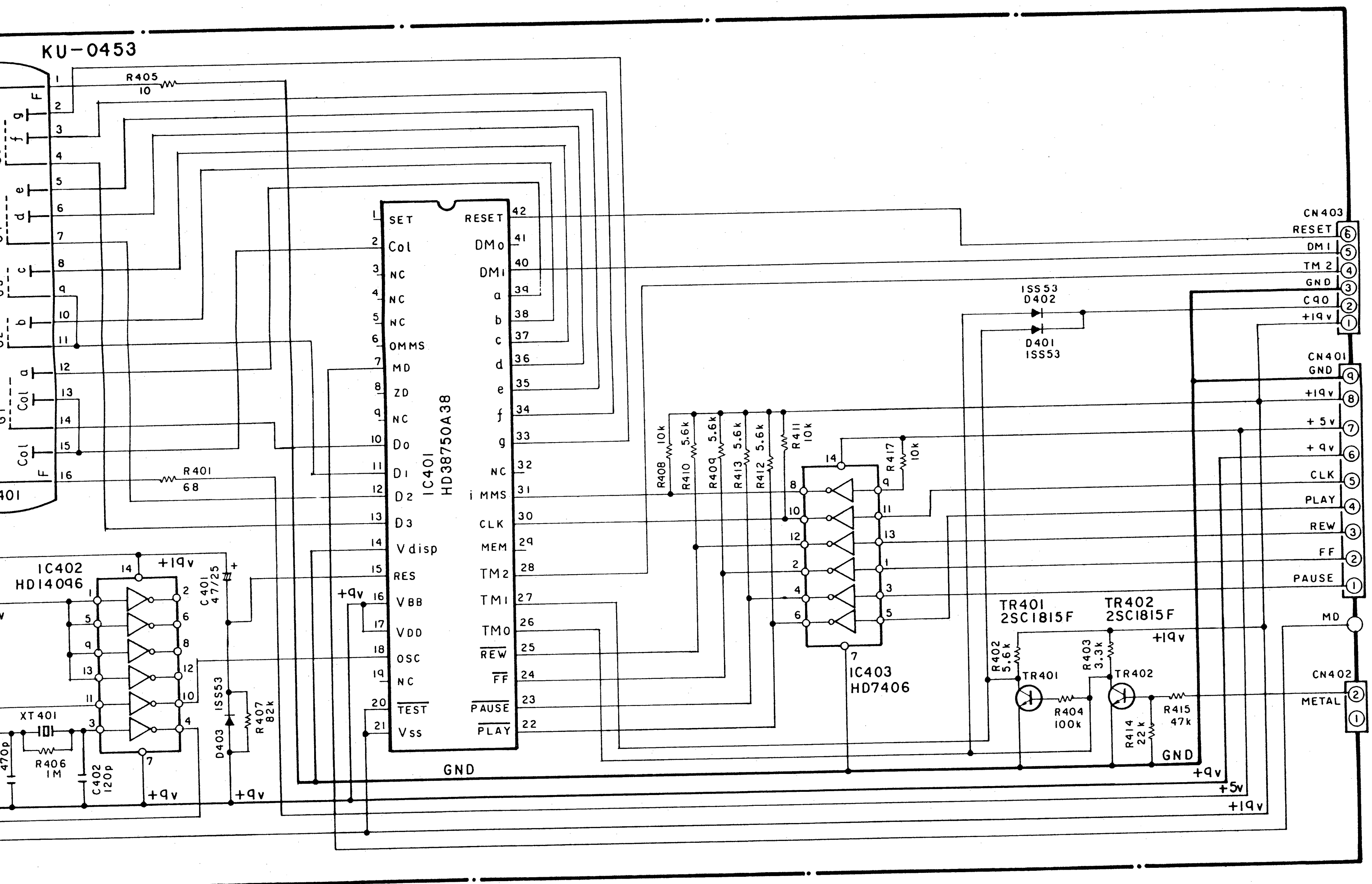
SCHEMATIC DIAGRAM OF FL COUNTER UNIT



FL COUNTER CPU Terminal Function Table (IC401: HD3875

Terminal number	Name	Input/ output	Function	Ter
				STOP
1	SET (NC)		NON CONNECTION	0.05
2	COL	Output	Colon indication output terminal	0.05
3	NC		NON CONNECTION	0.05
4	NC		〃	0.04
5	NC		〃	0.04
6	OMMS (NC)		〃	0.04
7	MD (NC)		〃	0.04
8	ZD (NC)		〃	0.04
9	TEO (NC)		〃	0.04
10	D$_0$	Output	Display tube grid terminal	0.9
11	D$_1$	Output		0.9
12	D$_2$	Output		0.9
13	D$_3$	Output		0.9
14	Vdisp	Input	Power input terminal for the display tube: OV (GND)	0
15	RST	Input	RESET terminal for the microcomputer	8.6
16	VBB	Input	Power input terminal: 10V	8.7
17	VDD	Input		8.7
18	OSC	Input	OSC pulse terminal for the microcomputer	13.6
19	NC		NON CONNECTION	–
20	TEST	Input	Microcomputer TEST	18.8
21	VSS	Input	Power earth input terminal: 19V	18.8
22	$\overline{\text{PLAY}}$	Input	Record/Play signal terminal	17.7
23	$\overline{\text{PAS}}$	Input	Pause signal terminal	17.7
24	$\overline{\text{FF}}$	Input	Fast forward signal terminal	17.7

TIC DIAGRAM OF FL COUNTER UNIT


KU-0453
R405 10
R401 68
401
IC402 HD14096
+19v
C401 47/25
XT401
R406 1M
C402 120p
470p
+9v
ISS53 D403
R407 82k
+9v
IC401 HD38750A38
SET
Col
NC
OMMS
MD
ZD
Do
D1
D2
D3
Vdisp
RES
VBB
VDD
OSC
TEST
Vss
RESET
DMo
DMi
a
b
c
d
e
f
g
NC
i MMS
CLK
MEM
TM2
TM1
TMo
REW
FF
PAUSE
PLAY
GND
R408 10k
R410 5.6k
R409 5.6k
R413 5.6k
R412 5.6k
R411 10k
R417 10k
IC403 HD7406
ISS53 D402
D401 ISS53
TR401 2SC1815F
TR402 2SC1815F
R402 5.6k
R403 3.3k
R404 100k
R414 22k
R415 47k
+19v
GND
+9v
+5v
+19v
CN403
RESET
DM1
TM2
GND
C90
+19v
CN401
GND
+19v
+5v
+9v
CLK
PLAY
REW
FF
PAUSE
MD
CN402
METAL

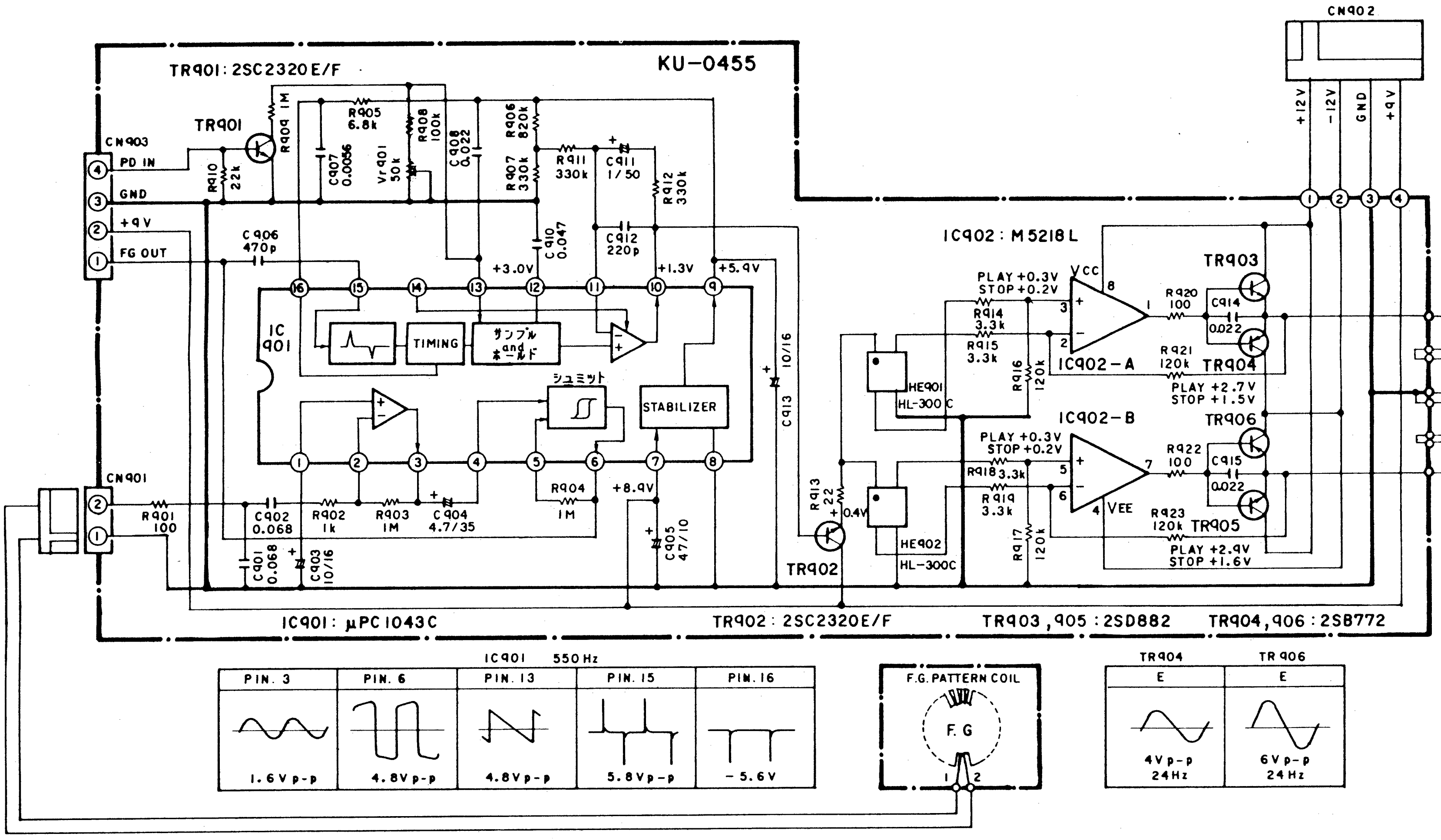
Note:
- Resistance shall be 1/4W unless otherwise specified and the unit is Ω.
- The unit of capacitor is μF, P is pF unless otherwise specified.
- This circuit diagram shows the basic circuit. It is subject to change for the purpose of improvement.

ER CPU Terminal Function Table (IC401: HD38750A38)

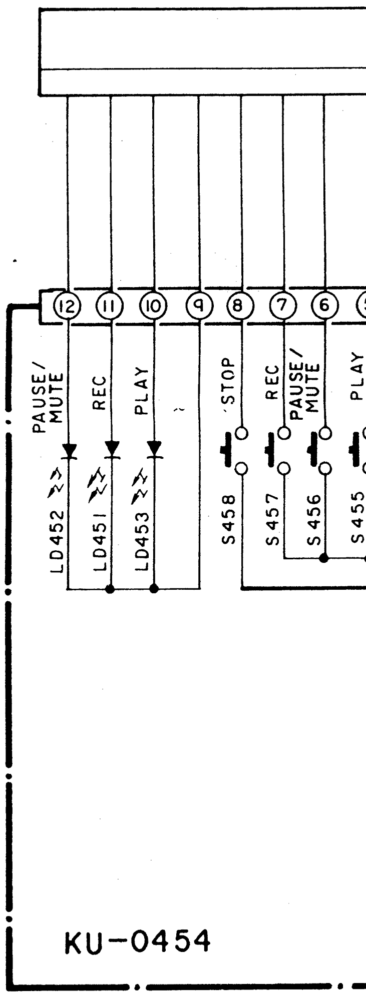
ne	Input/ output	Function	Terminal voltage (V) STOP	COUNTER	Remain
(NC)		NON CONNECTION	0.05	0.04	0.05
	Output	Colon indication output terminal	0.05	0.04	18.6
		NON CONNECTION	0.05	0.04	0.05
		〃	0.04	0.04	0.05
		〃	0.04	0.04	0.05
(NC)		〃	0.04	0.03	0.05
(NC)		〃	0.04	0.04	0.04
(NC)		〃	0.04	0.04	0.04
(NC)		〃	0.04	0.03	0.04
	Output	Display tube grid terminal	0.9	0.9	0.9
	Output		0.9	0.9	0.9
	Output		0.9	0.9	0.9
	Output		0.9	0.9	0.9
	Input	Power input terminal for the display tube: OV (GND)	0	0	0
	Input	RESET terminal for the microcomputer	8.6	8.6	8.6
	Input	Power input terminal: 10V	8.7	8.7	8.7
	Input		8.7	8.7	8.7
	Input	OSC pulse terminal for the microcomputer	13.6	13.6	13.6
		NON CONNECTION	—	—	—
	Input	Microcomputer TEST	18.8	18.8	18.8
	Input	Power earth input terminal: 19V	18.8	18.8	18.8
	Input	Record/Play signal terminal	17.7	0.09	0.09
	Input	Pause signal terminal	17.7	17.7	17.7
	Input	Fast forward signal terminal	17.7	17.7	17.7

Terminal number	Name	Input/ output	Function	Terminal voltage (V) STOP	COUNTER	Remain
25	$\overline{\text{REW}}$	Input	Rewind signal terminal	17.7	17.7	17.7
			Tape (length) mode terminal C-60 MC-60 C-90 C-120 LC46 LMC-46			
26	TM_0	Input	H L L L H L	0.09	0.09	0.09
27	TM_1	Input	L H L L L H	17.8	17.8	17.8
28	TM_2	Input	L L H L H H	0	0	0
29	MEM (NC)		NON CONNECTION	0.06	0.06	0.06
30	CLK	Input	Counter pulse terminal	18.8	0	0
31	IMMS (NC)		NON CONNECTION	0.06	0.06	0.06
32	NC		〃	0.06	0.06	0.06
33	g	Output	Display tube data output terminal	0.05	0.05	1.6
34	f	Output		18.7	18.7	1.6
35	e	Output		18.7	18.7	1.4
36	d	Output		18.7	18.7	18.7
37	c	Output		18.7	18.7	9.4
38	b	Output		18.7	18.7	18.7
39	a	Output		18.7	18.7	18.7
			Display mode terminal COUNTER REM TIME STOP WATCH MMS			
40	DM_0	Input	L H L H	0.05	0.05	18.7
41	DM_1	Input	L L H H	0.05	0.05	0.05
42	RESET	Input	Display tube zero-reset terminal	0.05	0.04	0.05
			When RESET is pushed:	18.8	18.8	18.8

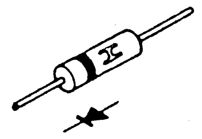
SCHEMATIC DIAGRAM OF CAPSTAN SERVO UNIT


KU-0455
TR901: 2SC2320E/F
TR901
CN903
④ PD IN
③ GND
② +9V
① FG OUT
R910 22k
R909 1M
R905 6.8k
C907 0.0056
VR901 50k
R908 100k
C908 0.022
R906 820k
R907 330k
R911 330k
C911 1/50
R912 330k
C906 470p
C910 0.047
C912 220p
+3.0V
+1.3V
+5.9V
IC 901
TIMING
サンプル and ホールド
シュミット
STABILIZER
C913 10/16
R904 1M
+8.9V
C905 47/10
CN901
R901 100
C902 0.068
R902 1k
R903 1M
C904 4.7/35
C901 0.068
C903 10/16
IC901: μPC1043C
TR902: 2SC2320E/F
TR903, 905: 2SD882
TR904, 906: 2SB772
R913 22
0.4V
TR902
HE901 HL-300C
HE902 HL-300C
IC902: M5218L
PLAY +0.3V
STOP +0.2V
R914 3.3k
R915 3.3k
R916 120k
IC902-A
VCC
R920 100
C914 0.022
R921 120k
TR903
TR904
PLAY +2.7V
STOP +1.5V
IC902-B
PLAY +0.3V
STOP +0.2V
R918 3.3k
R919 3.3k
R917 120k
VEE
R922 100
C915 0.022
R923 120k
TR905
TR906
PLAY +2.9V
STOP +1.6V
LA-1
LA-2
LB-1
LB-2
CN902
+12V
-12V
GND
+9V
IC901 550Hz
PIN. 3 1.6Vp-p
PIN. 6 4.8Vp-p
PIN. 13 4.8Vp-p
PIN. 15 5.8Vp-p
PIN. 16 -5.6V
F.G. PATTERN COIL
F.G
TR904 E 4Vp-p 24Hz
TR906 E 6Vp-p 24Hz

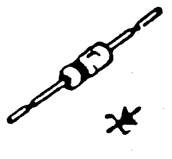
SCHEMATIC DIAG


PAUSE/MUTE
REC
PLAY
STOP
REC
PAUSE/MUTE
PLAY
LD452
LD451
LD453
S458
S457
S456
S455
KU-0454

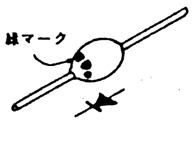
LEAD CONNECTION OF SEMICONDUCTORS



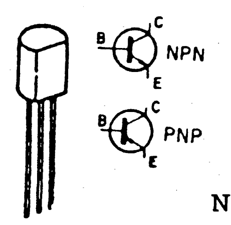
1S2076
1N34A
1S1588
1SS53
RB3・0EB2



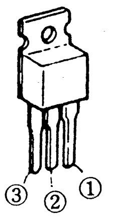
HZ4B2
HZ5A2
HZ5C3
HZ6B1
HZ6C3
HZ7A3
HZ9B1
HZ11B2



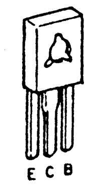
RV06


B
C
E
NPN
B
C
E
PNP

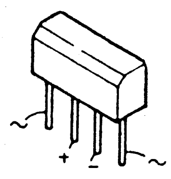
2SA733
2SA1015Y/GR
2SC2603E/F
2SC1815GR
2SC2060Q 2SC2320E/F
2SA966Y 2SC945P



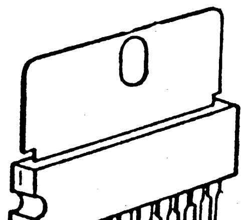
NJM78M09A



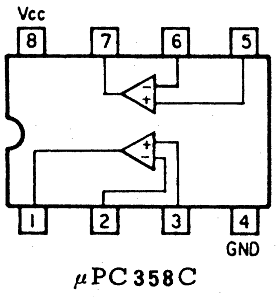
2SB772Q/P
2SD882Q/P



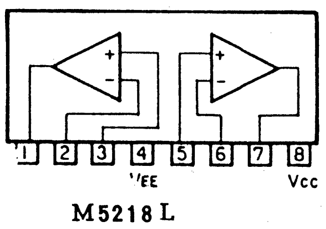
RB152



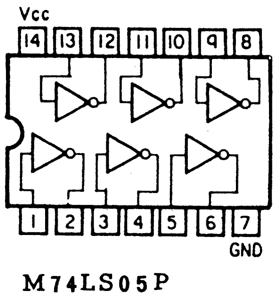
BA6109


Vcc
8 7 6 5
1 2 3 4
GND

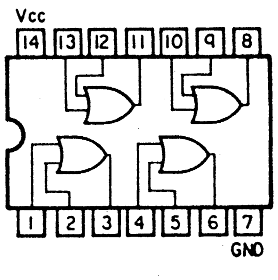
μPC358C
μPC4557C
LA6458DS


1 2 3 4 5 6 7 8
VEE
Vcc

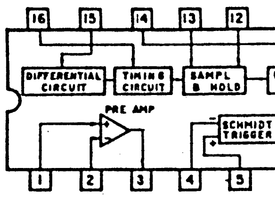
M5218L
M5220L

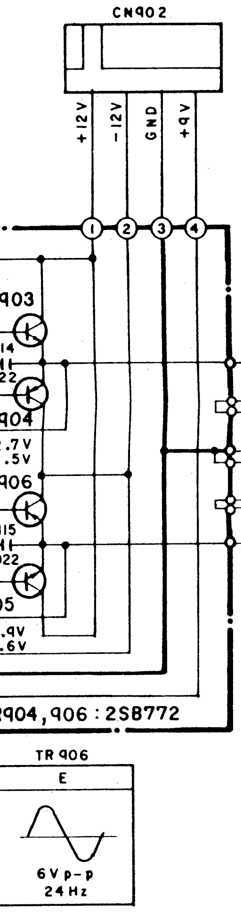

Vcc
14 13 12 11 10 9 8
1 2 3 4 5 6 7
GND

M74LS05P
HD14069UBP
HD7406


Vcc
14 13 12 11 10 9 8
1 2 3 4 5 6 7
GND

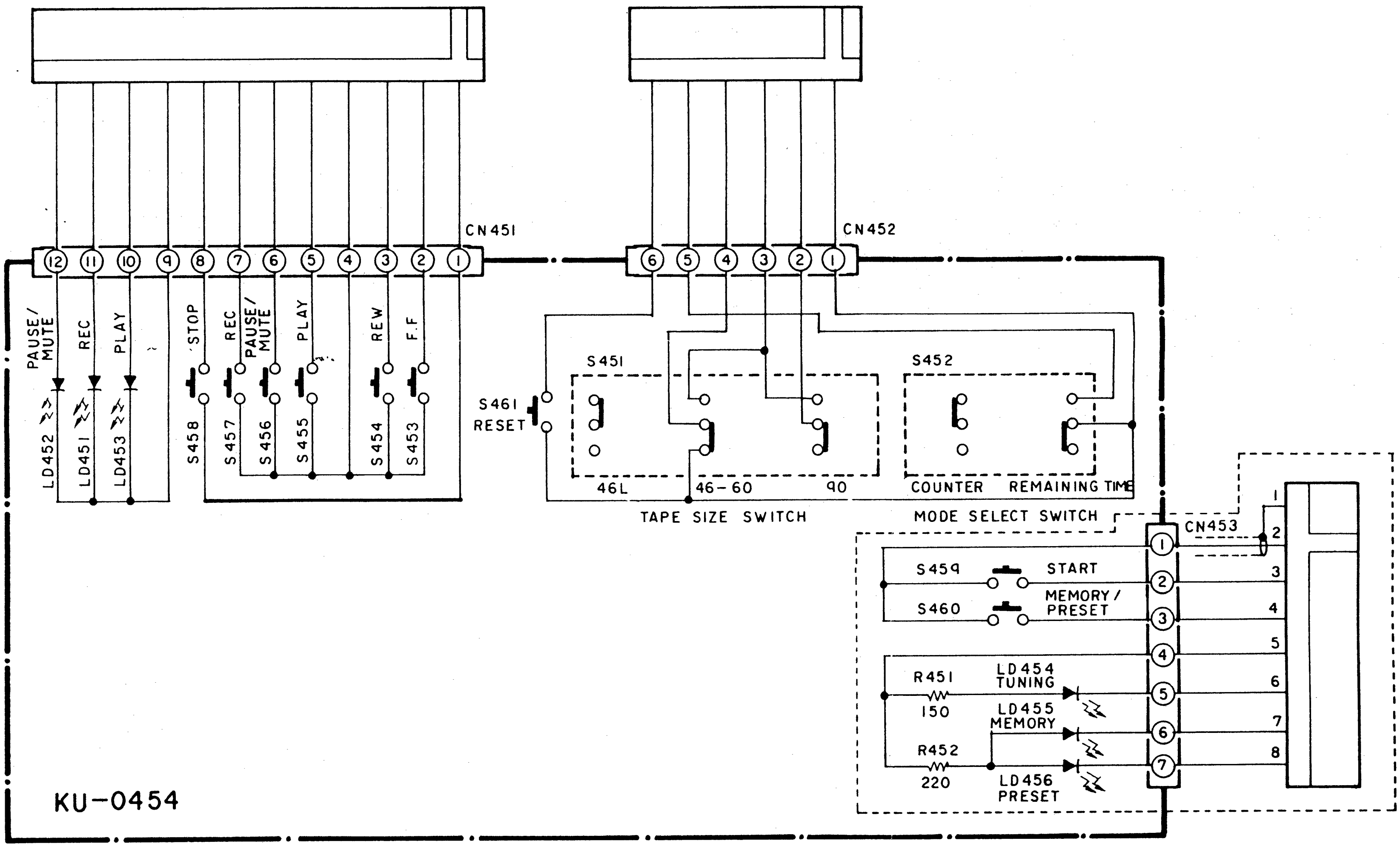
M74LS32P


16 15 14 13 12
DIFFERENTIAL CIRCUIT
TIMING CIRCUIT
SAMPL & HOLD
PRE AMP
SCHMIDT TRIGGER
1 2 3 4 5



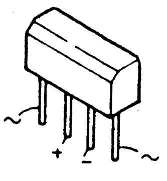
CN902
+12V
-12V
GND
+9V
LA-1
LA-2
LB-1
LB-2
904, 906 : 2SB772
TR 906
E
6V p-p
24 Hz

SCHEMATIC DIAGRAM OF CONTROL UNIT



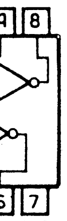
CN451
CN452
PAUSE/MUTE
REC
PLAY
STOP
REC
PAUSE/MUTE
PLAY
REW
F.F
LD452
LD451
LD453
S458
S457
S456
S455
S454
S453
S461
RESET
S451
S452
46L
46-60
90
TAPE SIZE SWITCH
COUNTER
REMAINING TIME
MODE SELECT SWITCH
CN453
S459
START
S460
MEMORY/PRESET
R451
150
LD454
TUNING
LD455
MEMORY
R452
220
LD456
PRESET
KU-0454

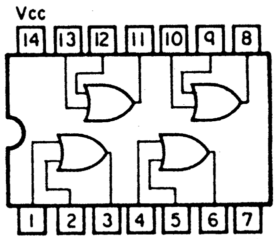
Note:
- Resistance shall be 1/4W unless otherwise specified and the unit is Ω.
- The unit of capacitor is μF, P is pF unless otherwise specified.
- This circuit diagram shows the basic circuit. It is subject to change for the purpose of improvement.



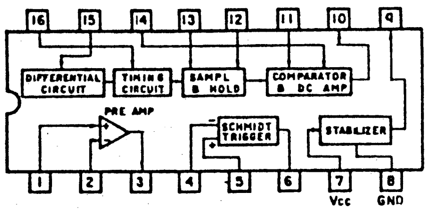
RB 152

/P
/P



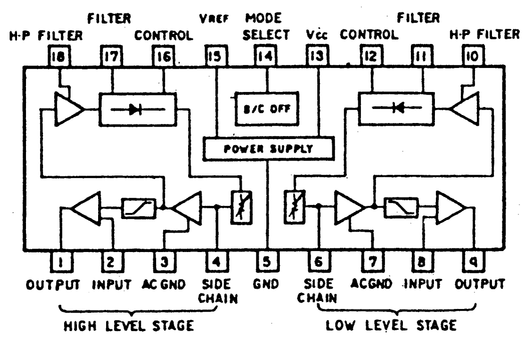


M74 LS 32 P



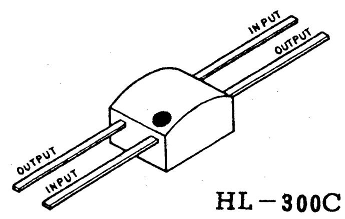
DIFFERENTIAL CIRCUIT
TIMING CIRCUIT
SAMPL & HOLD
COMPARATOR & DC AMP
PRE AMP
SCHMIDT TRIGGER
STABILIZER
Vcc
GND

μPC 1043 C



FILTER
H-P FILTER
CONTROL
VREF
MODE SELECT
Vcc
FILTER CONTROL
H-P FILTER
B/C OFF
POWER SUPPLY
OUTPUT
INPUT
AC GND
SIDE CHAIN
GND
SIDE CHAIN
AC GND
INPUT
OUTPUT
HIGH LEVEL STAGE
LOW LEVEL STAGE

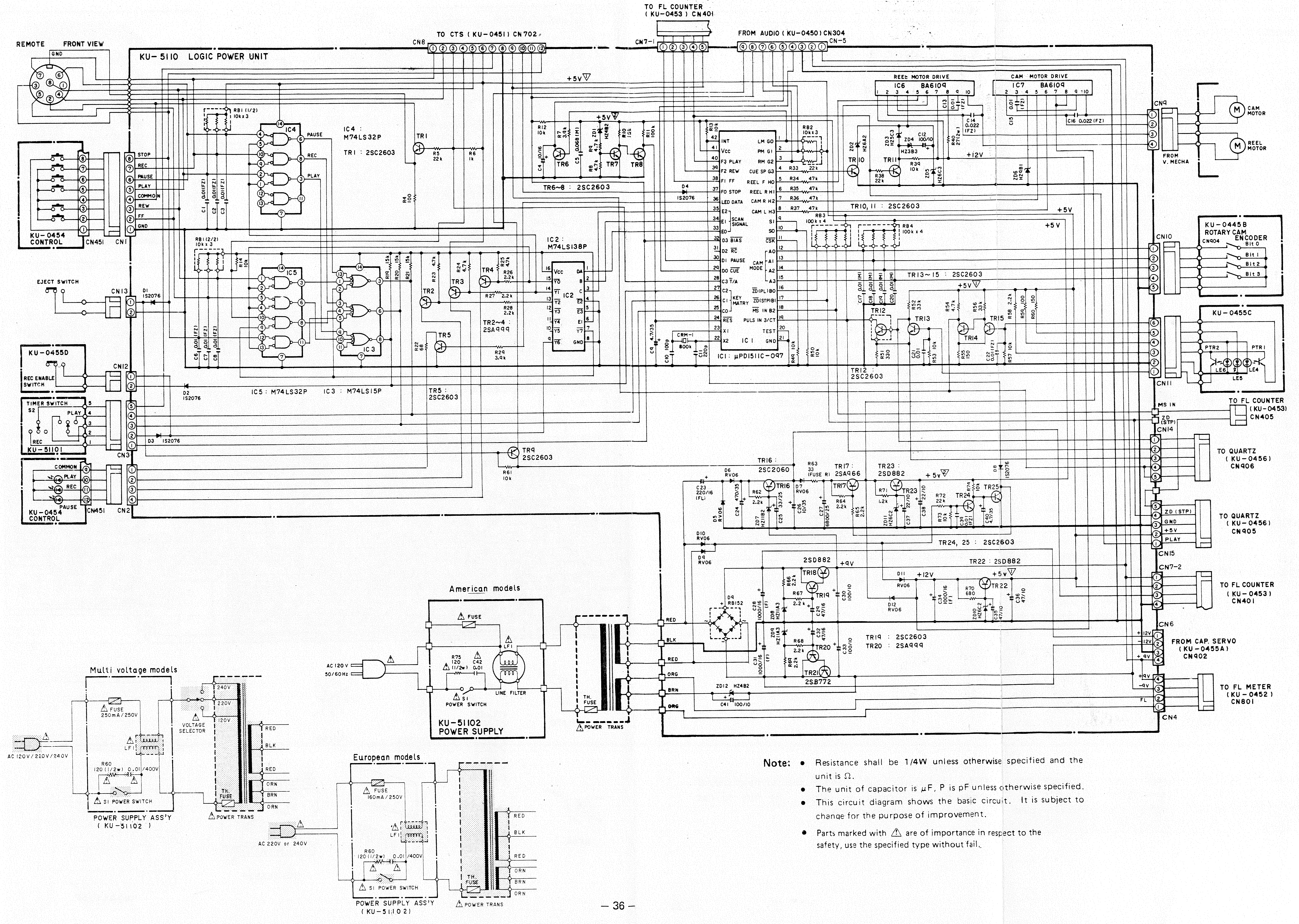
NE 652



INPUT
OUTPUT
OUTPUT
INPUT

HL-300C

SCHEMATIC DIAGRAM OF LOGIC AND POWER UNIT



KU-5110 LOGIC POWER UNIT
REMOTE
FRONT VIEW
GND
TO CTS (KU-0451) CN702
CN8
TO FL COUNTER (KU-0453) CN401
CN7-1
FROM AUDIO (KU-0450) CN304
CN-5
+5V
REEL MOTOR DRIVE
IC6 BA6109
CAM MOTOR DRIVE
IC7 BA6109
CN9
CAM MOTOR
REEL MOTOR
FROM V. MECHA
STOP
REC
PAUSE
PLAY
COMMON
REW
FF
GND
KU-0454 CONTROL
CN451
CN1
RB1 (1/2) 10k×3
IC4
IC4 : M74LS32P
TR1 : 2SC2603
PAUSE
REC
PLAY
TR1
R5 22k
R6 1k
R4 100
C1 0.01(FZ)
C2 0.01(FZ)
C3
R12 10k
R7 3.3k
C5 0.068(M)
ZD1 HZ4B2
R8 4.7k
R9 4.7k
R10 15k
R11 100k
C4 10/16
TR6
TR7
TR8
TR6~8 : 2SC2603
D4 1S2076
R13 10k
INT
Vcc
F3 PLAY
F2 REW
F1 FF
F0 STOP
LED DATA
E2
E1
E0
D3 BIAS
D2 RC
D1 PAUSE
D0 CUE
C3 T/A
C2
C1
C0
RES
X1
X2
SCAN SIGNAL
KEY MATRY
CAM MODE
LM G0
PM G1
RM G2
CUE SP G3
REEL F H0
REEL R H1
CAM R H2
CAM L H3
SI
SO
CSK
A0
A1
A2
A3
ZD(PL)B0
ZD(STP)B1
MS IN B2
PULS IN 3/CT
TEST
GND
IC1 : μPD1511C-097
RB2 10k×3
R33 22k
R34 47k
R35 47k
R36 47k
R37 47k
RB3 100k×4
RB4 100k×4
ZD2 HZ6A2
ZD3 HZ5C3
ZD4 HZ3B3
C12 100/10
C13 0.01(FZ)
C14 0.022(FZ)
R40 27(1/2W)
C15 0.01(FZ)
C16 0.022(FZ)
ZD5 HZ6C3
ZD6 HZ9B1
TR10
TR11
R38 22k
R39 10k
+12V
TR10, 11 : 2SC2603
+5V
CN10
KU-0445B ROTARY CAM ENCODER
CN904
Bit 0
Bit 1
Bit 2
Bit 3
KU-0455C
PTR2
PTR1
LE6
LE4
LE5
CN11
EJECT SWITCH
CN13
D1 1S2076
RB1 (2/2) 10k×3
R14 10k
IC5
IC3
R19 15k
R20 15k
R21 15k
R23 4.7k
R24 4.7k
R25 4.7k
R26 2.2k
R27 2.2k
R28 2.2k
TR2
TR3
TR4
TR2~4 : 2SA999
R29 3.9k
TR5
R22
IC2 : M74LS138P
IC2
Vcc
G1
G2A
G2B
A
B
C
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
GND
C6 0.01(FZ)
C7 0.01(FZ)
C8 0.01(FZ)
C9 4.7/35
C10 100p
CRM-1 800k
C11 220p
R49 10k
R50 10k
C17 0.01(M)
C18 0.01(M)
C19 0.01(M)
C20 0.01(M)
TR12
R51 330
R52 33k
TR13
R54 4.7k
R56 33k
TR15
R58 2.2k
R59 100
R60 150
TR14
R53 10k
R55 150
C21 0.01
C22 0.01(FZ)
R57 10k
TR13~15 : 2SC2603
TR12 2SC2603
KU-0455D
REC ENABLE SWITCH
CN12
D2 1S2076
IC5 : M74LS32P
IC3 : M74LS15P
TR5 : 2SC2603
TIMER SWITCH
S2
PLAY
REC
KU-51101
CN3
D3 1S2076
TR9 2SC2603
R61 10k
COMMON
PLAY
REC
PAUSE
KU-0454 CONTROL
CN451
CN2
MS IN
ZD (STP)
CN14
TO FL COUNTER (KU-0453) CN405
TO QUARTZ (KU-0456) CN906
TO QUARTZ (KU-0456) CN905
ZD (STP)
GND
+5V
PLAY
CN15
TR16 : 2SC2060
R63 33 (FUSE R)
TR17 : 2SA966
TR23 : 2SD882
D6 RV06
C23 220/16 (FL)
C24 470/35
R62 2.2k
D7 RV06
C25 33/25
C26 10/35
C27 6800/25
R64 2.2k
R65 2.2k
ZD7 HZ11B2
D5 RV06
R71 1.2k
R72 22k
R73 10k
R74 10k
TR24
TR25
C37 22/10
C38 22/10
C39 0.01(FZ)
C40 4.7/35
ZD11 HZ6C2
D8 1S2076
TR24, 25 : 2SC2603
D10 RV06
D9 RV06
2SD882
+9V
TR18
TR19
R66 2.2k
R67 2.2k
C30 100/10
C29 47/16
C28 1000/16 (F)
ZD8 HZ11A3
D9 RB152
TR22 : 2SD882
D11 RV06
+12V
C34 1000/16 (F)
R70 680
C35 47/10
C36 47/10
ZD10 HZ6C2
D12 RV06
TR22
CN7-2
TO FL COUNTER (KU-0453) CN401
CN6
+12V
-12V
+9V
FROM CAP. SERVO (KU-0455A) CN902
ZD9 HZ11A3
R68 2.2k
C32 47/16
C33 100/10
TR20
TR21
R69 2.2k
C31 1000/16 (F)
2SB772
TR19 : 2SC2603
TR20 : 2SA999
+9V
-9V
FL
CN4
TO FL METER (KU-0452) CN801
ZD12 HZ4B2
C41 100/10
RED
BLK
RED
ORG
BRN
ORG
American models
FUSE
R75 120 (1/2W)
C42 0.01
LF1
LINE FILTER
S1 POWER SWITCH
KU-51102 POWER SUPPLY
AC 120V 50/60Hz
TH. FUSE
POWER TRANS
Multi voltage models
FUSE 250mA/250V
LF1
R60 120 (1/2W) 0.01/400V
S1 POWER SWITCH
POWER SUPPLY ASS'Y (KU-51102)
AC 120V/220V/240V
VOLTAGE SELECTOR
240V
220V
120V
TH. FUSE
POWER TRANS
RED
BLK
RED
ORN
BRN
ORN
European models
FUSE 160mA/250V
LF1
R60 120 (1/2W) 0.01/400V
S1 POWER SWITCH
POWER SUPPLY ASS'Y (KU-51102)
AC 220V or 240V
TH. FUSE
POWER TRANS
RED
BLK
RED
ORN
BRN
ORN

Note:
- Resistance shall be 1/4W unless otherwise specified and the unit is Ω.
- The unit of capacitor is μF, P is pF unless otherwise specified.
- This circuit diagram shows the basic circuit. It is subject to change for the purpose of improvement.
- Parts marked with ⚠ are of importance in respect to the safety, use the specified type without fail.

PARTS LIST OF P.W. BOARD

KU-5110 LOGIC AND POWER UNIT

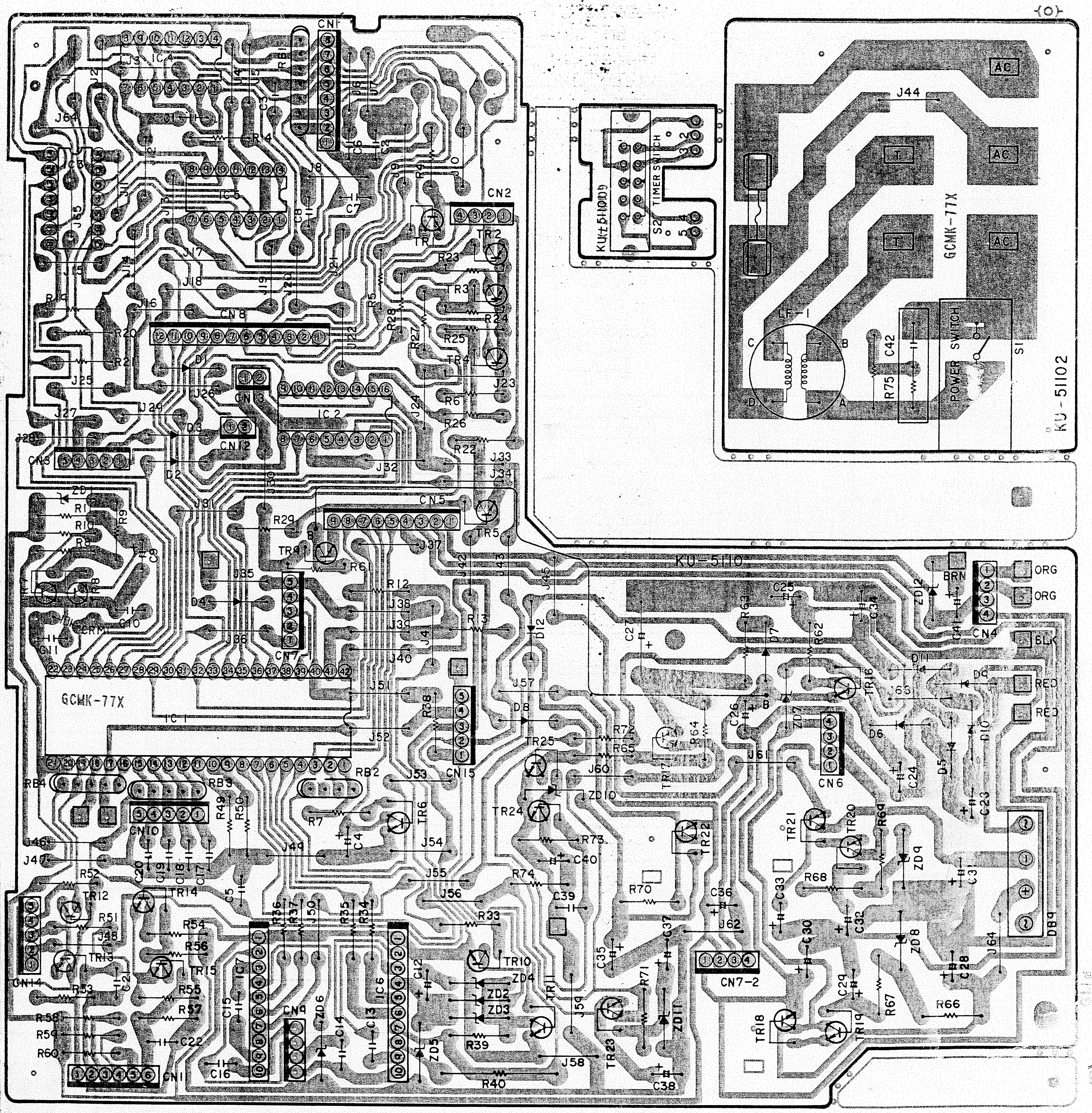
Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTOR GROUP			
		I C	
IC1	2620408006	μPD1511C-097	
IC2	2620427003	HD74LS138P	
IC3	2620443003	HD74LS15P	
IC4, 5	2620294003	HD74LS32P	
IC6, 7	2620326007	BA6109	
		Trangister	
TR17	2710105002	2SA966 (Y)	
TR2~4, 20	2710113010	2SA999(F)	
TR21	2720055029	2SB772Q/P	
TR16	2730195005	2SC2060(Q)	
TR1, 5~9, 11~15, 19, 24, 25	2730204022	2SC2320(E/F)	
TR18, 22 23	2740078031	2SD882 (Q/P)	
		Diode	
D1~4, 8	2760049008	IS2076	
D5~7 10~12	2760237001	RV06	
D9	2760246005	RB152	
ZD4	2760299052	HZ3B3	
ZD1, 12	2760185027	HZ4B2	
ZD3	2760236057	HZ5C3	
ZD10, 11	2760303003	HZ6C2	
ZD5	2760173071	HZ6C3	
ZD6	2760218046	HZ9B1	
ZD8, 9	2760052082	HZ11A3	
ZD7	2760052079	HZ11B2	
RESISTOR GROUP			
R40	2440079026	RS14B3D270JNBF	27Ω 2W
R63	2412315035	RD14B2E330GFRF	33Ω ¼W
R75 ⚠	2410163001	RD14B2H121J	120Ω ½W
RB1	2462018007	RK99=2B103MP6	10kΩx6 1/8W
RB2	2462011075	RK99=2B103MP3	10kΩx3 1/8W
RB3, 4	2462010092	RK99=2B104MP4	100kΩx4 1/8W
CAPACITOR GROUP			
		Ceramic	
C10	2533627000	CC45SL1H101J	100PF 50V
C11	2533635005	CC45SL1H221J	220PF 50V
C17~20	2531004007	CK45B1H102K	1000PF 50V
C1~3 6~8, 13 15, 21, 22 39	2531024003	CK45F1H103Z	0.01μF 50V
C14, 16	2531025002	CK45F1H223Z	0.022μF 50V
C5	2539014002	CK45=1E683M	0.068μF 25V
C42 ⚠	2538010007	CK45=2GAC103P	0.01μF 400V AC
		Electrolytic	
C37, 38	2544128006	CE04W1A220=	22μF 10V
C35, 36	2544129005	CE04W1A470=	47μF 10V
C12, 33 41, 30	2544130007	CE04W1A101=	100μF 10V
C4	2544132005	CE04W1C100=	10μF 16V
C29, 32	2544135002	CE04W1C470=	47μF 16V
C23	2544163003	CE04W1C221M	220μF 16V
C28, 31 34	2544163032	CE04W1C102M	1000μF 16V
C25	2544137000	CE04W1E330=	33μF 25V
C27	2546060007	CE04W1E682M	6800μF 25V
C9, 40	2544140000	CE04W1V4R7=	4.7μF 35V
C26	2544141009	CE04W1V100=	10μF 35V
C24	2544165014	CE04W1V471M	470μF 35V
OTHER PARTS GROUP			
	4170140100	RADIATOR	
CN12, 13	2032075001	2PCONNECTOR BASE	
CN2, 6, 9	2035622024	4PMINI CONN PIN	
CN3, 10	2035622066	5PMINI CONN PIN	
CN11	2035622082	6PCONN BASE	
CN1	2035622037	8PMINI CONNE PIN	
CN5	2035622095	9PCONN BASE	
CN8	2050170001	12P BOARD BASE	
CN4	2037642015	4PEI WITH WIRE	
CN7	2045405008	9PEI CON WITH WIRE	
CN14	2039632023	5P EI CONNE WIRE	
CM1	3998031007	CERAMIC RESONATOR	
	2048110002	8P DIN JACK	
S2	2129188005	SLIDE SWITCH	
S1 ⚠	2129136028	POWER SW	
LF1 ⚠	2398019002	LINE FILTER COIL	
	FEP1287	FUSE HOLDER	
	4128747005	SHIELD BRACKET	

- The carbon resistors rated at ¼W are not listed herein.

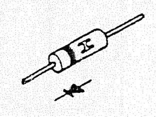
WARNING:
Parts marked with ⚠ and/or shading have special characteristics important to safety. Be sure to use the specified parts for replacement.

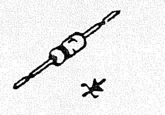
P. W. BOARD

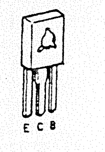
KU-5110 LOGIC AND POWER UNIT



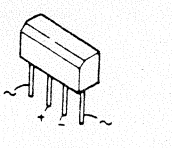
CN1
CN2
CN4
CN5
CN6
CN7
CN8
CN14
IC1
IC2
KU-5110
KU-51102
GCMK-77X
TIMER SWITCH
POWER SWITCH
S1
S2
LF1
R75
C42
J44
AC
ORG
BRN
BLK
RED
R40
C38
J58


1S2076

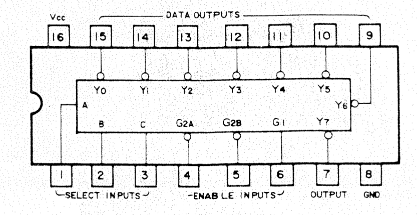

HZ3B3
HZ4B2
HZ5C3
HZ6C2
HZ6C3
HZ9B1
HZ11B2
HZ11A3



2SB772
2SD882

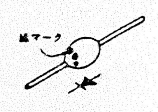


RB152

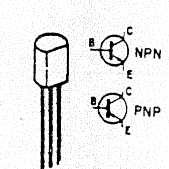


Vcc
DATA OUTPUTS
16
15
14
13
12
11
10
9
Y0
Y1
Y2
Y3
Y4
Y5
Y6
A
B
C
G2A
G2B
G1
Y7
1
2
3
4
5
6
7
8
SELECT INPUTS
ENABLE INPUTS
OUTPUT
GND

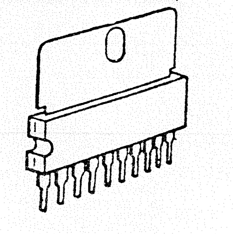
HD74LS138

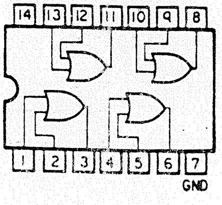


RV06



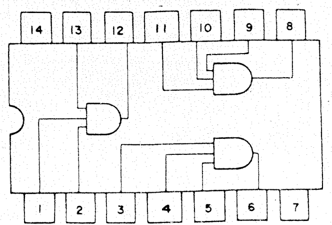
2SA966
2SA999
2SC2060
2SC2320


BA6109



Vcc
14
13
12
11
10
9
8
1
2
3
4
5
6
7
GND

HD74LS32P



14
13
12
11
10
9
8
1
2
3
4
5
6
7

HD74LS15P

SH 013/20

DENON

Hi-Fi Component

240
368

SERVICE MANUAL

STEREO CASSETTE TAPE DECK

MODEL DR-M2/M3/M4

(IMPROVED TYPE)

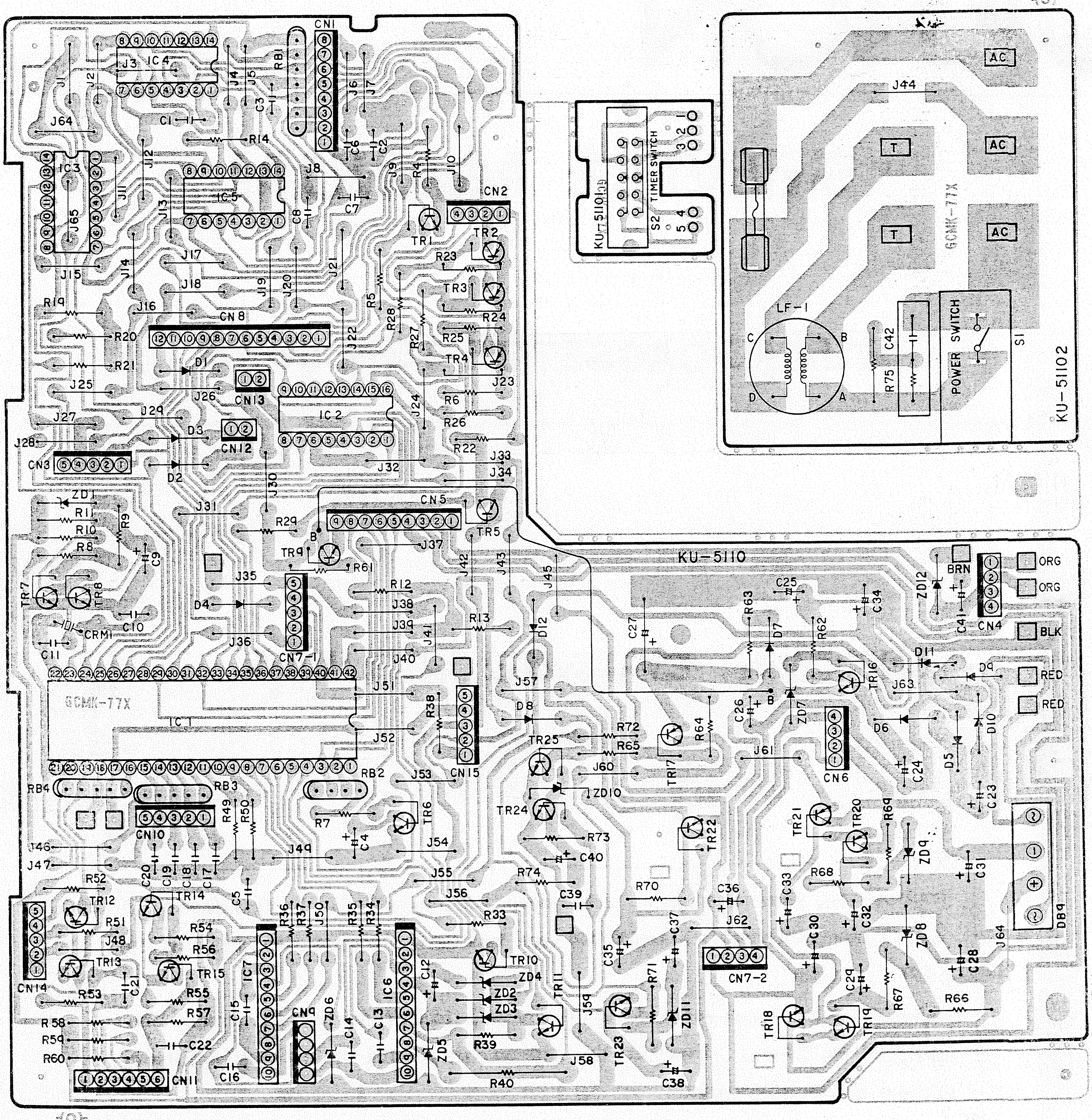
Improvements have been made to the power source and logic circuits described in the already published DR-M2/M3/M4, and this Service Manual describes only the improved sections.
When repairs are being carried out, kindly refer to both this and the already published Service Manual. However, there are no changes either to the specifications or to the external appearance.

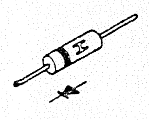
NIPPON COLUMBIA CO., LTD.

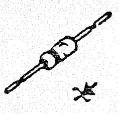
P. W. BOARD

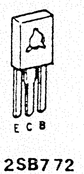
2-42

KU-5110 LOGIC AND POWER UNIT

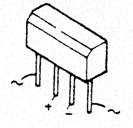

KU-5110
KU-51101(b)
KU-51102
TIMER SWITCH
S2
POWER SWITCH
S1
LF-1
GCMK-77X
J44
AC
T
C42
R75
IC1
IC2
IC3
IC4
IC5
IC6
IC7
CN1
CN2
CN3
CN4
CN5
CN6
CN7-1
CN7-2
CN8
CN9
CN10
CN11
CN12
CN13
CN14
CN15
RB1
RB2
RB3
RB4
CRM1
DB9
ORG
ORG
BRN
BLK
RED
RED

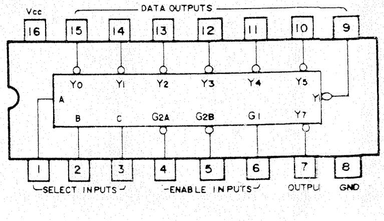

1S2076

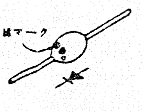

HZ3B3
HZ4B2
HZ5C3
HZ6C2
HZ6C3
HZ9B1
HZ11B2
HZ11A3



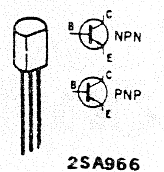
2SB772
2SD882

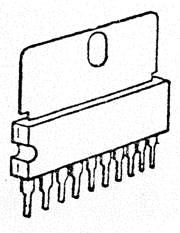

RB152

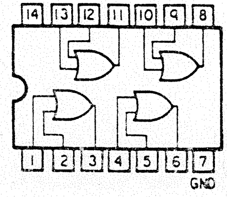

Vcc
DATA OUTPUTS
16
15
14
13
12
11
10
9
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
A
B
C
G2A
G2B
G1
1
2
3
4
5
6
7
8
SELECT INPUTS
ENABLE INPUTS
OUTPUT
GND
HD74LS138

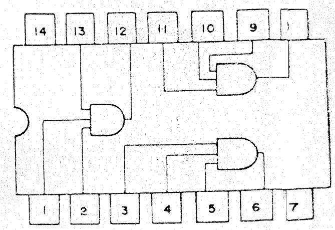


RV06

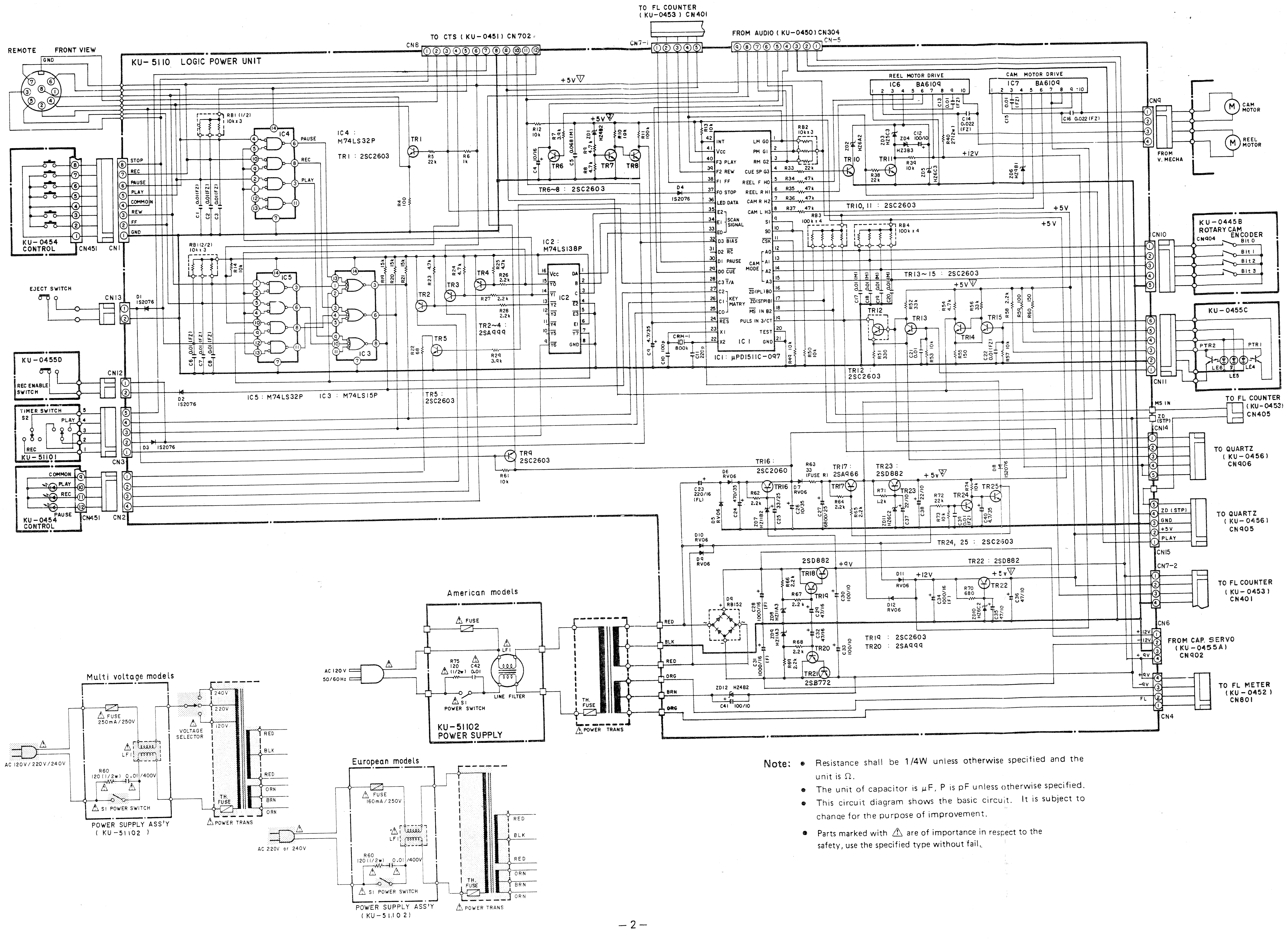

B
C
E
NPN
B
C
E
PNP
2SA966
2SA999
2SC2060
2SC2320


BA6109


Vcc
14
13
12
11
10
9
8
1
2
3
4
5
6
7
GND
HD74LS32P

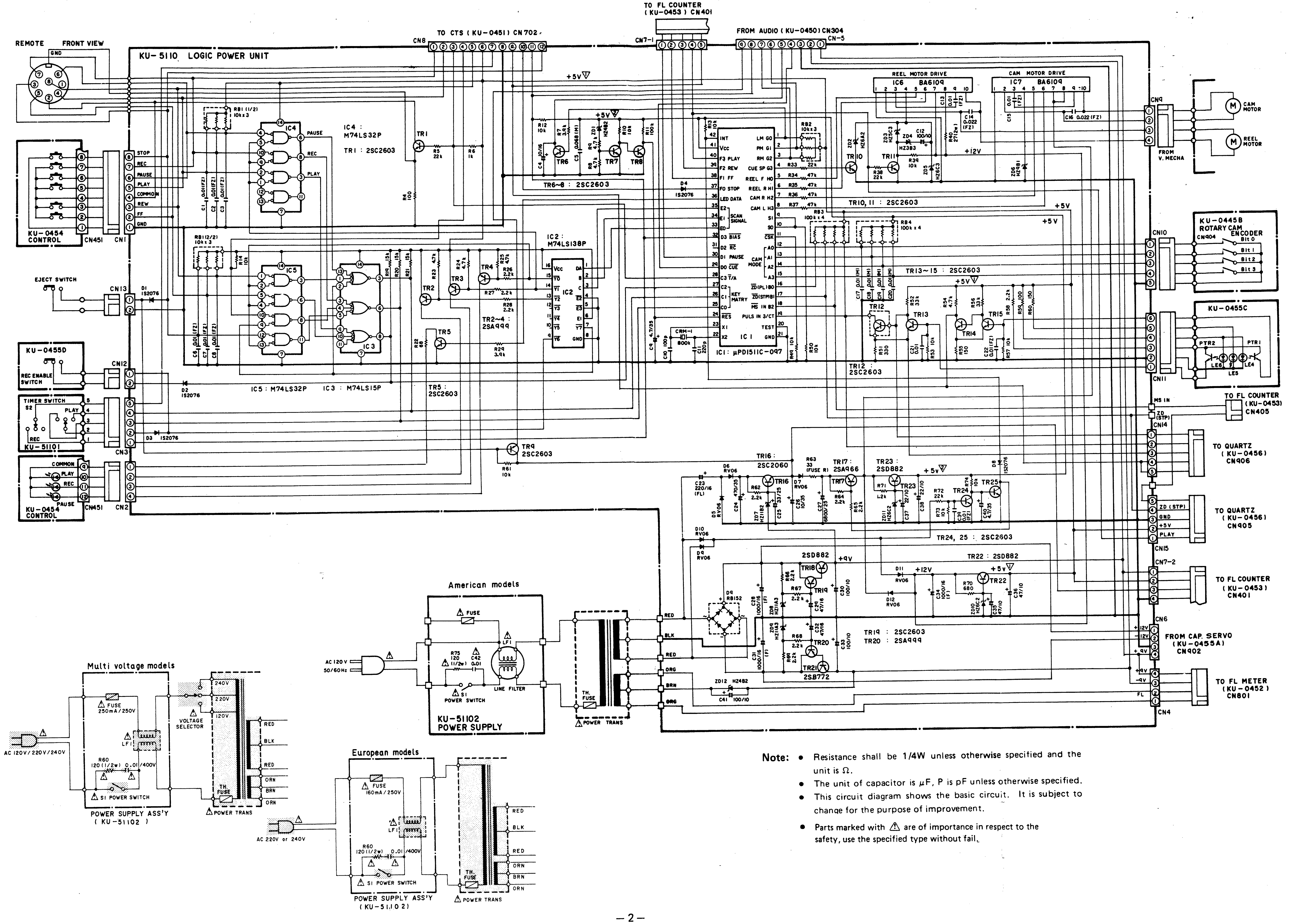

14
13
12
11
10
9
1
1
2
3
4
5
6
7
HD74LS15P

SCHEMATIC DIAGRAM OF LOGIC AND POWER UNIT


KU-5110 LOGIC POWER UNIT
REMOTE
FRONT VIEW
GND
TO CTS (KU-0451) CN702
CN8
TO FL COUNTER (KU-0453) CN401
CN7-1
FROM AUDIO (KU-0450) CN304
CN-5
REEL MOTOR DRIVE
IC6 BA6109
CAM MOTOR DRIVE
IC7 BA6109
CN9
CAM MOTOR
REEL MOTOR
FROM V. MECHA
+5V
+12V
STOP
REC
PAUSE
PLAY
COMMON
REW
FF
GND
KU-0454 CONTROL
CN451
CN1
RB1 (1/2) 10k x 3
IC4
IC4 : M74LS32P
TR1 : 2SC2603
TR1
TR6~8 : 2SC2603
TR6
TR7
TR8
ZD1 HZ4B2
D4 1S2076
INT
Vcc
F3 PLAY
F1 FF
F2 REW
F0 STOP
LED DATA
SCAN SIGNAL
D3 BIAS
D2 REC
D1 PAUSE
D0 CUE
C3 T/A
KEY MATRY
RES
CAM MODE
PULS IN 3/CT
TEST
GND
CRM-1 800k
IC1 : μPD1511C-097
RB2 10k x 3
RB3 100k x 4
RB4 100k x 4
TR10, 11 : 2SC2603
TR10
TR11
ZD2 HZ6A2
ZD3 HZ5C3
ZD4 HZ3B3
ZD5 HZ6C3
ZD6 HZ9B1
KU-0445B ROTARY CAM ENCODER
CN904
Bit 0
Bit 1
Bit 2
Bit 3
CN10
TR13~15 : 2SC2603
TR12
TR13
TR14
TR15
TR12 : 2SC2603
KU-0455C
PTR1
PTR2
LE4
LE5
LE6
CN11
MS IN
ZD (STP)
CN14
TO FL COUNTER (KU-0453) CN405
TO QUARTZ (KU-0456) CN906
TO QUARTZ (KU-0456) CN905
EJECT SWITCH
CN13
D1 1S2076
RB1 (2/2) 10k x 3
IC5
IC3
IC2 : M74LS138P
IC2
TR2
TR3
TR4
TR5
TR2~4 : 2SA999
TR5 : 2SC2603
IC5 : M74LS32P
IC3 : M74LS15P
KU-0455D
REC ENABLE SWITCH
CN12
D2 1S2076
TIMER SWITCH
S2
PLAY
REC
KU-51101
CN3
D3 1S2076
TR9 2SC2603
KU-0454 CONTROL
CN451
CN2
TR16 : 2SC2060
TR17 : 2SA966
TR23 : 2SD882
TR24, 25 : 2SC2603
TR22 : 2SD882
2SD882
TR18
TR19
TR20
TR21
2SB772
TR19 : 2SC2603
TR20 : 2SA999
D9 RB152
ZD12 HZ4B2
+9V
+12V
CN15
CN7-2
TO FL COUNTER (KU-0453) CN401
CN6
FROM CAP. SERVO (KU-0455A) CN902
TO FL METER (KU-0452) CN801
CN4
FL
American models
FUSE
LF1
AC 120V 50/60Hz
R75 120 (1/2W)
C42 0.01
S1 POWER SWITCH
LINE FILTER
KU-51102 POWER SUPPLY
TH. FUSE
POWER TRANS
RED
BLK
RED
ORG
BRN
ORG
Multi voltage models
FUSE 250mA/250V
LF1
R60 120 (1/2W)
0.01/400V
S1 POWER SWITCH
AC 120V/220V/240V
VOLTAGE SELECTOR
240V
220V
120V
POWER SUPPLY ASS'Y (KU-51102)
POWER TRANS
European models
FUSE 160mA/250V
AC 220V or 240V
POWER SUPPLY ASS'Y (KU-51102)
ORN

Note:
- Resistance shall be 1/4W unless otherwise specified and the unit is Ω.
- The unit of capacitor is μF, P is pF unless otherwise specified.
- This circuit diagram shows the basic circuit. It is subject to change for the purpose of improvement.
- Parts marked with ⚠ are of importance in respect to the safety, use the specified type without fail.

SCHEMATIC DIAGRAM OF LOGIC AND POWER UNIT


KU-5110 LOGIC POWER UNIT
TO CTS (KU-0451) CN702
TO FL COUNTER (KU-0453) CN401
FROM AUDIO (KU-0450) CN304
CN8
CN7-1
CN-5
REMOTE
FRONT VIEW
GND
STOP
REC
PAUSE
PLAY
COMMON
REW
FF
GND
KU-0454 CONTROL
CN451
CN1
EJECT SWITCH
CN13
D1 1S2076
KU-0455D
REC ENABLE SWITCH
CN12
D2 1S2076
TIMER SWITCH
S2
PLAY
REC
KU-51101
CN3
D3 1S2076
COMMON
PLAY
REC
PAUSE
KU-0454 CONTROL
CN451
CN2
RB1 (1/2) 10k x 3
RB1 (2/2) 10k x 3
IC4 : M74LS32P
TR1 : 2SC2603
IC5 : M74LS32P
IC3 : M74LS15P
IC2 : M74LS138P
TR2~4 : 2SA999
TR5 : 2SC2603
TR6~8 : 2SC2603
TR9 2SC2603
+5V
IC1 : μPD1511C-097
CRM-1 800k
INT
Vcc
F3 PLAY
F2 REW
F1 FF
F0 STOP
LED DATA
SCAN SIGNAL
KEY MATRY
RES
X1
X2
LM G0
PM G1
RM G2
CUE SP G3
REEL F H0
REEL R H1
CAM R H2
CAM L H3
CAM MODE
PULS IN 3/CT
TEST
GND
RB2 10k x 3
RB3 100k x 4
RB4 100k x 4
REEL MOTOR DRIVE
IC6 BA6109
CAM MOTOR DRIVE
IC7 BA6109
TR10, 11 : 2SC2603
TR12 : 2SC2603
TR13~15 : 2SC2603
+12V
CN9
CAM MOTOR
REEL MOTOR
FROM V. MECHA
CN10
KU-0445B ROTARY CAM ENCODER
CN404
Bit 0
Bit 1
Bit 2
Bit 3
KU-0455C
PTR2
PTR1
LE6
LE4
LE5
CN11
MS IN
ZD (STP)
TO FL COUNTER (KU-0453) CN405
CN14
TO QUARTZ (KU-0456) CN906
ZD (STP)
GND
+5V
PLAY
TO QUARTZ (KU-0456) CN905
CN15
CN7-2
TO FL COUNTER (KU-0453) CN401
CN6
+12V
-12V
+9V
FROM CAP. SERVO (KU-0455A) CN902
+9V
-9V
FL
TO FL METER (KU-0452) CN801
CN4
TR16 : 2SC2060
TR17 : 2SA966
TR23 : 2SD882
TR24, 25 : 2SC2603
2SD882
TR22 : 2SD882
TR19 : 2SC2603
TR20 : 2SA999
2SB772
D9 RB152
ZD12 HZ4B2
American models
FUSE
R75 120 (1/2w)
C42 0.01
S1 POWER SWITCH
LF1
LINE FILTER
KU-51102 POWER SUPPLY
AC 120V 50/60Hz
TH. FUSE
POWER TRANS
RED
BLK
RED
ORG
BRN
ORG
Multi voltage models
FUSE 250mA/250V
LF1
R60 120 (1/2w) 0.01/400V
S1 POWER SWITCH
POWER SUPPLY ASS'Y (KU-51102)
AC 120V/220V/240V
VOLTAGE SELECTOR
240V
220V
120V
TH. FUSE
POWER TRANS
RED
BLK
RED
ORN
BRN
ORN
European models
FUSE 160mA/250V
LF1
R60 120 (1/2w) 0.01/400V
S1 POWER SWITCH
POWER SUPPLY ASS'Y (KU-51102)
AC 220V or 240V
TH. FUSE
POWER TRANS
RED
BLK
RED
ORN
BRN
ORN

Note:
- Resistance shall be 1/4W unless otherwise specified and the unit is Ω.
- The unit of capacitor is μF, P is pF unless otherwise specified.
- This circuit diagram shows the basic circuit. It is subject to change for the purpose of improvement.
- Parts marked with ⚠ are of importance in respect to the safety, use the specified type without fail.

PARTS LIST OF P.W. BOARD

KU-5110 LOGIC AND POWER UNIT

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTOR GROUP			
		I C	
IC1	2620408006	μPD1511C-097	
IC2	2620427003I	HD74LS138P	
IC3	2620443003	HD74LS15P	
IC4, 5	2620294003	HD74LS32P	
IC6, 7	2620326007	BA6109	
		Trangister	
TR17	2710105002	2SA966 (Y)	
TR2~4, 20	2710113010	2SA999(F)	
TR21	2720055029	2SB772Q/P	
TR16	2730195005	2SC2060(Q)	
TR1, 5~9, 11~15, 19, 24, 25	2730204022	2SC2320(E/F)	
TR18, 22 23	2740078031	2SD882 (Q/P)	
		Diode	
D1~4, 8	2760049008	IS2076	
D5~7 10~12	2760237001	RV06	
D9	2760246005	RB152	
ZD4	2760299052	HZ3B3	
ZD1, 12	2760185027	HZ4B2	
ZD3	2760236057	HZ5C3	
ZD10, 11	2760303003	HZ6C2	
ZD5	2760173071	HZ6C3	
ZD6	2760218046	HZ9B1	
ZD8, 9	2760052082	HZ11A3	
ZD7	2760052079	HZ11B2	
RESISTOR GROUP			
R40	2440079026	RS14B3D270JNBF	27Ω 2W
R63	2412315035	RD14B2E330GFRF	33Ω ¼W
R75 ⚠	2410163001	RD14B2H121J	120Ω ½W
RB1	2462018007	RK99=2B103MP6	10kΩx6 1/8W
RB2	2462011075	RK99=2B103MP3	10kΩx3 1/8W
RB3, 4	2462010092	RK99=2B104MP4	100kΩx4 1/8W
CAPACITOR GROUP			
		Ceramic	
C10	2533627000	CC45SL1H101J	100PF 50V
C11	2533635005	CC45SL1H221J	220PF 50V
C17~20	2531004007	CK45B1H102K	1000PF 50V
C1~3 6~8, 13 15, 21, 22 39	2531024003	CK45F1H103Z	0.01μF 50V
C14, 16	2531025002	CK45F1H223Z	0.022μF 50V
C5	2539014002	CK45=1E683M	0.068μF 25V
C42 ⚠	2538010007	CK45=2GAC103P	0.01μF 400V AC
		Electrolytic	
C37, 38	2544128006	CE04W1A220=	22μF 10V
C35, 36	2544129005	CE04W1A470=	47μF 10V
C12, 33 41, 30	2544130007	CE04W1A101=	100μF 10V
C4	2544132005	CE04W1C100=	10μF 16V
C29, 32	2544135002	CE04W1C470=	47μF 16V
C23	2544163003	CE04W1C221M	220μF 16V
C28, 31 34	2544163032	CE04W1C102M	1000μF 16V
C25	2544137000	CE04W1E330=	33μF 25V
C27	2546060007	CE04W1E682M	6800μF 25V
C9, 40	2544140000	CE04W1V4R7=	4.7μF 35V
C26	2544141009	CE04W1V100=	10μF 35V
C24	2544165014	CE04W1V471M	470μF 35V
OTHER PARTS GROUP			
	4170140100	RADIATOR	
CN12, 13	2032075001	2PCONNECTOR BASE	
CN2, 6, 9	2035622024	4PMINI CONN PIN	
CN3, 10	2035622066	5PMINI CONN PIN	
CN11	2035622082	6PCONN BASE	
CN1	2035622037	8PMINI CONNE PIN	
CN5	2035622095	9PCONN BASE	
CN8	2050170001	12P BOARD BASE	
CN4	2037642015	4PEI WITH WIRE	
CN7	2045405008	9PEI CON WITH WIRE	
CN14	2039632023	5P EI CONNE WIRE	
CM1	3998031007	CERAMIC RESONATOR	
	2048110002	8P DIN JACK	
S2	2129188005	SLIDE SWITCH	
S1 ⚠	2129136028	POWER SW	
LF1 ⚠	2398019002	LINE FILTER COIL	
	FEP1287	FUSE HOLDER	
	4128747005	SHIELD BRACKET	

- The carbon resistors rated at ¼W are not listed herein.

WARNING:
Parts marked with ⚠ and/or shading have special characteristics important to safety. Be sure to use the specified parts for replacement.